AVIATION

The Oldest American Aeronautical Magazine

MARCH 7, 1927 | Issued Weekly | PRICE 15 CENTS

Loening Amphibians of the Pan-American Flight, en route to Barranquilla

VOLUME XXII

NUMBER 10

SPECIAL FEATURES

THE CURTISS 1550 ENGINES
NIGHT FLYING IN BAD WEATHER
THE SPERRY AERO OIL ENGINE

GARDNER PUBLISHING CO., INC.
HIGHLAND, N. Y.
250 W. 57TH ST., NEW YORK

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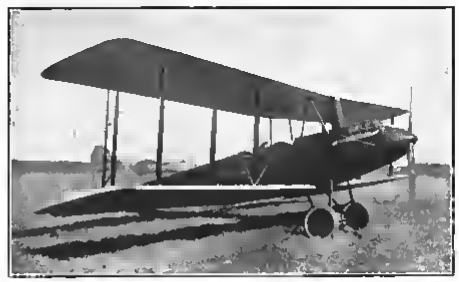

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With the Editor

At a time when the era of private flying is drawing closer, the question of simplifying the control of airplanes is of very first importance. Anything which makes the piloting of aircraft, especially small machines, such as are likely to be most popular among private owners, easier and more foolproof is to be received with great favor.

In this connection while nothing very startling has yet come to the fore the work of individual experimenters shows that the subject is by no means being neglected. Last week, AVIATION was able to give some details of the work of one such experimenter who has been rewarded with reasonable amount of success. This week the same general subject is treated from the standpoint of the experiments carried out by another worker along somewhat different lines.

Again along the lines of improving the safety and reliability of aircraft as also the economy a considerable amount of work is being done on the development of new kinds of power plants. Along very radical lines is the work of one prominent American engineer, who has been experimenting with light weight Diesel type engines. And furthermore, while not so radical but still of considerable significance is the development of a very high powered six cylinder inverted engine, produced by a well-known British firm. Close and detailed consideration is given to these developments in AVIATION this week.

AVIATION

The Oldest American Aeronautical Magazine

VOL. XXII MARCH 7, 1927 No. 10

Ladislas d'Orcy

FOR SIX years, the readers of AVIATION read the record of American aeronautics as written for them by one of the most capable writers on flying in the World. His opinions, expressed on this page, were not only illuminating but reflected well balanced and informed judgment. He was one of the foremost authorities on lighter-than-air, but his information on all aerial matters was comprehensive. His recent death in Paris, resulting from a minor injury received while flying to an American race meet, removes from the aeronautical world one of the best equipped writers of aviation news.

The personal charm of Mr. d'Orcy made him friends wherever he went, and although he has not been able to do active editorial work for the last two years, he managed to maintain his interest in American aeronautical affairs through correspondence.

A cheerful optimist, a man with brilliant talents, a passionate seeker for truth and accuracy—such a man has left his chosen field infinitely richer through his life. AVIATION joins his many friends in a genuinely sympathetic tribute which will make his memory one to be cherished by those who had the opportunity of knowing and admiring him.

Another Sign of the Times

WHILE those of us who are closely associated with the development of aeronautics need no convincing of the progress which has been and is still being made in the development of aviation as a sound commercial proposition, it is always of the greatest interest to observe from time to time the attitude of various factions of the general public towards aviation commercially. Accordingly, it is of some significance to note a recent issue of "Babson's Reports," published by the well-known Babson Statistical Organization, in which the whole of the front page is given over to the business opportunities being brought about by the airplane.

Pointing out that it has appeared to be the part of wisdom to refrain from making general predictions regarding aeronautics since "it is not something that can be built up over night," the report goes on to enumerate three reasons why the time has now come when advances in commercial aviation will be even more rapid. In the first place, the report says, safer and better planes are being built. Landing fields and marked airways are rapidly being developed. The public gradually is becoming 'airwise.'

The report continues: "There is a great opportunity for the cities and towns that can secure a place on these air routes. The time will come when it will be as necessary for a city to have air travel connection as it was in the early days to have railroad connection. Every city and town should immediately see to it that a suitable area, as centrally located as possible, is set aside for a future landing field. The quicker this action is taken the less the expense will be. Property values in the vicinity of such fields some day will be greatly increased."

As has been said before in these columns, it is never difficult to find a satisfactory plea for the slogan, "Build more airports," and yet each new argument tends to give added weight to this all important necessity. One outstanding point about the Babson statement is, however, of great significance. The plea is entered not only for the eventual placing of every city on an air route, but that "Every city should *immediately* see to it that a suitable area . . . . is set aside for a future landing field." Not sufficient is it for a municipality merely to assert that when an air route comes its way it plans to be air-minded and construct an airport. Airway or no airway, every municipality, which gives any thought to its future prosperity at all should, right now, set aside space for the construction of an airport, even if funds and other circumstances do not permit the building of such a port at this time. In these modern times civic developments take place very rapidly and unless some reservation is made early for the future "centrally located" airport it will be crowded out of the picture to the detriment of future prosperity for that community which is so short-sighted.

Every inland city has had real reason in the past to envy the coastal municipality in possession of a good harbor. Now, however, there is an even chance for all alike to benefit from the vast air commerce system which is bound to grow in the not distant future.

On Conquering the Air

REGARDING NOTHING in particular, one of the New York weekly papers was recently responsible for the statement, "The trouble with conquering the air is that it won't stay licked." This appears to sum up very pertinently at least one aspect of the reasons for the many long distance flights which are every year being attempted. This coming Summer we may expect to see quite a number of long distance non-stop flights get under way, not to mention attempts on speed, altitude and other records, but our New York daily may not have just the right idea about the development of aviation when it made this aphorism. That the air has, now, been "licked" is demonstrated by the Air Mail, the European airlines, etc., and the new undertakings may well be regarded as endeavors to further the conquest of the air, in which work they will prove eminently successful.

Accident Mars Progress of Pan-American Flight

"Detroit" and "New York" Collide When Preparing to Land at Buenos Aires Field

MISFORTUNE befell the Pan-American Flight consisting of five Loening Amphibian planes of the Army Air Corps, when, on arrival at Buenos Aires on Feb. 26, the "Detroit" and the "New York," flagship of the squadron, collided in the air, resulting in the deaths of Capt Clinton F Woolsey, pilot, and Lieut John W Benton, occupants of the former machine. Major Herbert A Dargue, commander of the flight, and Lieut C E Whitehead, flying in the "New York," jumped with their parachutes and were saved

The accident occurred when the four planes of the squadron—the San Antonio having been delayed earlier in the flight, it will be recalled—were preparing to land at the flying field at Palomar, situated in the outskirts of Buenos Aires The four planes arrived in formation accompanied by three Argentine machines which had gone out to meet them The exact reason for the accident could not be seen from the ground All the spectators could see was the sudden crash and a burst of smoke which soon rose in a dense column and obscured both the machines from view The two planes hit the ground together Lieutenant Benton's body was thrown out just before hitting the ground, and Captain Woolsey was burned to death in his plane Their bodies were immediately removed to a hospital at the flying field

Only a short while previously, the four machines had landed in the harbor at Buenos Aires and the fliers had been greeted by the Mayor of the city The squadron had flown about 250 miles from Mar del Plata, the Argentine Summer capital leaving there at 10.50 a m the same day and reaching the harbor early in the afternoon Their arrival at Buenos Aires marked the completion of almost half of the flight On Feb 28, they were due to start on the homeward leg going North their first stop being Asuncion Paraguay

An Eye-Witness Report

No official report has, at this time, been received, as this is written at the moment of going to press Capt Ira C Eaker, pilot of the "San Francisco," was, however, in a position to see exactly how the accident happened and made the following statement to the Associated Press

"We had just flown in [illegible] formation The four planes formed a diamond [illegible] landing field at Palomar Major Dargue piloting the New York at the head of the squadron signalled to the others the breaking up of the formation for the purpose of landing

Captain Woolsey in the "Detroit" in Number [illegible] position and the New York Number [illegible] turned [illegible] simultaneously Woolsey to the left Dargue to the right The New York continued as did the St Louis slightly higher and to the rear

The Detroit turned upward and away from the New York several hundred feet then turned back to the right and went into a slight dive

At that instant [illegible] was above the New York and probably did not see it The Detroit started a gentle gliding turn slightly [illegible] the New York's left wing the planes telescoped and began a spin as one plane

[illegible] parachute opened at an altitude of 1,000 ft. A second chute opened at about 500 ft Only two jumped with parachutes Another body fell free just before the planes struck the ground

The collision occurred at about 1,400 ft I thought the "New York" was the plane most damaged and from my position in the air thought the two who had escaped were the Detroit's crew

"On landing I found that Major Dargue and Lieutenant Whitehead had been saved by the parachutes"

Captain Woolsey was one of the best pilots in the Army Air Corps He was born Aug 29, 1894 at Northport, Mich, and attended Valparaiso College for three years He was graduated from the School of Military Aeronautics at Austin Texas, April 13, 1918, received flying training at Kelly Field, Texas, attended the officers' training camp at Fort Benjamin Harrison, Ind, and was then assigned to the Air Service

He performed duty overseas during the War, attending the Pursuit Flying School at the Third Aviation Instruction Centre at Issoudun, France

Upon his return to the United States he was assigned to duty at the Primary Flying School at Carlstrom Field Arcadia, Fla, where he served as engineer and operations officer of various flights

He was then transferred to Brooks Field, Texas, and assigned to command the Air Service Pilot School detachment Later he was made commanding officer of the Forty-sixth School Squadron and then chief test pilot. He was graduated from the Engineering School at McCook Field, Dayton, Ohio, on June 30, 1926, and when assigned to the Pan-American flight was on duty at that field

Captain Woolsey was the engineering officer of the Pan-American flight, having charge of all repairs, replacements, tuning and adjustments, and the surmounting of the difficulties met thus far was credited to his genius.

He began his Army career as a doughboy in the ranks, serving as a buck private in the Third Indiana Infantry on the Mexican border in 1916 and winning a commission as Second Lieutenant of Infantry before transferring to the Air Corps. As a flier he had a record of more than 2,500 flying hours He is survived by his widow

Lieutenant Benton was born Nov 27, 1896, at Manton, Cal, and was graduated in 1918 from the University of California The same year he was graduated from the School of Military Aeronautics at Berkeley, Cal

Lieutenant Benton received his flying training at Rockwell Field, San Diego Cal, and was commissioned a Second Lieutenant May 14, 1918 He then served at Dallas, Texas, Wilbur Wright Field, Ohio, Gerstner Field, Iowa, and again at Rockwell Field, where he was on duty as flying instructor in primary pursuit and Thomas Morse scout planes from August, 1918, until he was discharged from the service at his own request on Feb 4, 1919

He was reappointed a Second Lieutenant of the Air Service, Regular Army, on Sept 9, 1920 and assigned to March Field, Riverside Cal He was promoted to First Lieutenant on April 9 1921 transferred to Kelly Field then to Crissy Field at Presidio San Francisco and then to the Panama Canal Zone He was again on duty at Crissy Field when he was assigned to the South American flight

When Lieutenant Benton left the Air Service in 1919 he tried his hand at lumbering, and though he achieved some success he longed to get back aloft and took up aviation as a civilian This did not satisfy him and he re-entered the Army His flying record totals more than 2,000 hr He is survived by his wife and two children

Progress to Date

Until now, the flight has made remarkably good progress in spite of having incurred some serious problems Only a week or so ago four of the Loening Amphibians flew from Mejillones, Chile, to Santiago Chile a distance of 890 miles in one day The San Antonio did not participate with the other planes in this part of the flight

Following are the details of the flight chronologically arranged:

Feb 17—The planes resumed their flight southward along the Chilean Coast at 11 a.m

Feb 18—They left [illegible] at 9 45 a m and landed at Mejillones at 2 45 p m The San Antonio arrived at Paita at 3 p m The four planes left Mejillones Chile at 7 10 a.m. and arrived at Santiago Chile late Feb 18 from Coquimbo Chile where they remained less than two hours after landing from Mejillones The San Antonio reached Lima, from Trujillo, Peru and remained all night

Feb 19—The engine of the San Antonio failed making it necessary to change

Feb 22—The St. Louis New York and Detroit flew from Santiago to Valparaiso in the afternoon The San Francisco was left at Santiago The San Antonio delayed at Lima, Peru by engine trouble

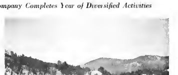
Feb 23—The Detroit St. Louis and New York arrived at Talcahuano, A R. at noon from Valparaiso The San Francisco was reported en route. The four planes arrived at Valdivia at 8 30

Feb 24—The planes left Valdivia at 8.00 a.m and arrived at Bahia Blanca at 3 10 p m

Feb. 25—The San Antonio passed over Tocopilla at 2 50 p.m. The San Francisco, New York, Detroit and St. Louis arrived at Mar del Plata, A R on the afternoon of Feb 25

Curtiss Flying Service Again Reports Prosperous Year

America's Oldest Aerial Service Company Completes Year of Diversified Activities



Curtiss planes on skis waiting at Echo Lake, Vt for the Coolidge funeral pictures

TO THOSE who are interested in the commercial aspects of flying, the report of the Curtiss Flying Service for 1926, will be of absorbing interest Based on actual operating figures and showing extensive activity in almost every phase of commercial flying the report is a convincing and encouraging proof that this type of service, when properly organized and administered, finds a ready market with the American public

The Curtiss Flying Service is said to be the oldest flying organization in the World It was founded, in 1910, by Glenn H Curtiss "to stimulate interest in aviation by demonstration and exhibition of aerial flight," and with the exception of a short period during the World War, has functioned continuously since that time Its scope of operation has gradually widened, and judging from the 1926 report, the original charter might well now read "to stimulate confidence in aviation by demonstration of the practicability of commercial flying"

The report of this company for 1926 shows a total of 2,320 hr of flying time, corresponding to approximately 175,000 miles of air travel Of this 2,060 hr, or almost 90 per cent was paid commercial flying It is extremely interesting to note that the Curtiss Flying Service is conducted primarily as a "clinic" of commercial flying, in order that the Curtiss Company, by actual experience may keep abreast of the progress in commercial flying, and the remarkable amount of business secured last year carried almost without solicitation and without extensive advertising The flying time was distributed as follows

Paid Flying		*"Unpaid" Flying*	
Cross-country	519 hr	Testing	240 hr
Aerial photography	248 hr	Demonstration, etc	20 hr
Passengers	272 hr		
Instruction	685 hr		
Student solo	52 hr.		
Miscellaneous	284 hr		
Total	2060 hr	Total	260 hr

The prosaic heading "Cross-country—519 hr" gives little indication of the varied and interesting flying exploits that made up this total time Under this heading are included all the flights made with photographers and camera men to cover important news events in the United States All of the major news agencies and "news reel" organizations in New York regularly use the Flying Service to cover important stories, to an extent that will probably astonish the average citizen

Last July, for instance, a terrific explosion destroyed the Naval Arsenal at Dover, N J The news agencies immediately arranged for the Curtiss Flying Service to "cover" the disaster During the day, eight round trips with reporters and camera men, were made to the scene of the explosion, some 75 miles from Curtiss Field. Excellent pictures and stories were obtained, in spite of the fact that the scene resembled a miniature battle-field, with reporters on the ground unable to get within three miles of the arsenal On the same day, the amphibian operated by the Curtiss Flying Service made a round-trip passenger flight to St. Regis Lake in the Adirondacks, and in addition an emergency crew took care of the usual Sunday business in passenger flights and instruction at Curtiss Field The day's activities showed the remarkable total of more than 3,500 miles of flying Every flight was completed according to schedule, a tribute not only to the skill of the pilots, but also to the excellent ground organization of the Curtiss Flying Service

Another outstanding feat was the trip of three machines to Vermont on the occasion of the death of Colonel Coolidge in March In this case, weather conditions presented an unusual problem There was no snow on Curtiss Field, but there was more than three feet of it on the surface of Echo Lake, the only available landing spot near the Coolidge homestead At Albany, along the way, there was an inch or two of snow The planes took off from Curtiss Field flew to Albany where the wheels were quickly replaced by skis that had been carried along, and then proceeded to Vermont, landing on the snow-covered lake It was necessary to "taxi" up and down the full length of the lake several times in order to pack down the soft, fluffy snow enough to permit taking-off the next morning, as soon as the pictures of President Coolidge's arrival were ready These were delayed due to the severe weather, and it was nearly noon when they were finally delivered to the waiting airplanes. The return trip was quickly made, with a stop at Albany to change back to wheels, and the pictures were delivered in New York in time for the afternoon editions of the newspapers The airplanes, after fueling up, immediately returned to Albany to spend the night, and proceeded to Vermont early next morning to get pictures of the funeral In spite of rain, fog, and snow, which made flying in the mountainous region all but impossible, the mission was successfully completed, and the pictures were delivered in New York in time for the evening editions of the newspapers.

Other Events Covered

Several machines covered the Florida hurricane, carrying reporters and photographers. One pilot flew 18 hr. out of twenty-six in making the round trip The raising of the sunken submarine S-51, the burning of a Hotel at Haines Falls, boat races at Poughkeepsie, horse races at Saratoga, Gertrude Ederle's return to the United States, prize fights, football games—these and many others were "covered" by Curtiss Flying Service airplanes chartered by the news agencies so that the public might get the news while it was fresh.

Under "Cross-country" also is included the transportation of passengers and merchandise to remote points, often in cases of desperate emergency, sometimes for convenience, sometimes for publicity, occasionally to gratify a whim Perhaps the most spectacular trip of this kind was that of a bond buyer who made a hurried trip to Florida. He telephoned

Curtiss Field from New York one day shortly after noon, and explained breathlessly that he must be in Tampa, Florida, before four o'clock the next afternoon, in order to close a business deal that meant a commission of eighteen thousand dollars! Could the Flying Service take care of him? They could—and did. Within ten minutes of his arrival at the field he was streaking southward in a Curtiss Oriole. He was landed one block from the destination at 2:40 p.m. the next day—and made his eighteen thousand.

On another occasion, a man in Greenwich, Conn. was called to the side of a dying relative in Atlantic City. To save time, the Curtiss amphibian was dispatched across Long Island Sound, picking up the passenger at Greenwich and returning with him to Curtiss Field. Here he was transferred to a faster plane and flown to Atlantic City, the whole job being completed in less than two hours. And, by way of comedy relief, a newlywed one day was dined—and wined—by his bachelor friends, with the result that when the 20th Century Limited pulled out of Grand Central Station, it carried a bewildered bride starting off on her honeymoon without her husband. A hurried telephone call, a quick trip in a taxi to Curtiss Field, and he went winging on his way in pursuit of the speeding Limited. He overtook the train at Syracuse and the day was saved.

Gene Tunney avoided the congested traffic on the day of his fight with Dempsey by flying from his training camp to Philadelphia; a rush shipment of Golflex clothes was carried all the way to Florida; three plane-loads of Goodrich Zipper overshoes were flown from Bethany to New York when the February blizzards tied up all transportation; even a tree—a live, sturdy tree—was carried from Lake Mahopac to New York where it was planted on Riverside Drive in memory of an A.E.F. soldier.

Aerial photography, while perhaps not so spectacular as some of the cross-country operations, is none the less valuable work, and occupied a prominent place in the company's operations during 1926. The company does not do the actual photography, but furnishes planes and pilots for all the large aerial photography organizations. The aerial maps thus secured were used by state departments in tax appraisal and highway planning, by public utilities corporations in planning extensions of telephone, electric light and other services, by real estate organizations in their development work, and by a host of others. During the year, more than 2,000 square miles of territory was mapped from Curtiss planes, and thousands of oblique photographs were taken.

Under "Miscellaneous" has been included a great deal of work in the production of current moving pictures, such as "Paradise," featuring Milton Sills, "The Lunatic at Large" with Leon Errol, "The Great Deception" a Robert Kane production, and others. Mimic air battles with half-a-dozen planes involved, night flights, and many other stunts were required in this work. Under the "Miscellaneous" heading is also included experimental dusting to destroy the "gypsy moth," for the U. S. Department of Agriculture, miscellaneous advertising flights, successful participation in racing events, and even such unusual stunts as aerial weddings.

Flying School and Joy Flights

Approximately ninety-five students were taught to fly during the year, and more than 3,800 passengers were carried, mostly on the popular $5.00 trips of ten miles. There were no injuries sustained by pilots, passengers, or students during the year. In fact, since its re-organization after the War, the Curtiss Flying Service has flown almost one million miles without a fatal accident, a record which compares favorably with that of any other means of transportation.

The flying equipment in use at present includes eighteen machines, Orioles, Jennies, Standards, one Lark, one DH, and the Amphibian. The only equipment lost during the year was one Oriole fuselage, which was damaged in a forced landing. The company expects to add at least one cabin monoplane, and a Curtiss Falcon to its fleet in 1927. The Falcon with its 150 mile high speed, large cargo capacity and long range, will be the "flagship" of the fleet.

One more statement will be of interest to the commercial operator: the Curtiss Flying Service report for 1926 shows a reasonable and satisfactory profit on the year's operations.

Air Taxis for London

Air Taxis, Ltd., is the name of a company, recently registered in London, for the purpose of providing airplanes to carry passengers and freight.

The directors of the company claim that they will be able to supply planes for trips to Cairo or other points by telephone call. For the shorter inland trips, the company claims that the air taxi will be cheaper than the road taxi.

An aerial view of down-town New York taken by Hamilton Maxwell, Inc. from a Curtiss Flying Service airplane.

Night Flying in Bad Weather

Some of the Air Mail Pilot's Problems. Are We on the Right Track Regarding Lighting Equipment?

By EDMUND T. ALLEN

ACROSS THE 500 mile course from the plains of Nebraska to the Utah Salt Lake desert, air mail pilots have to encounter practically all conditions of flying. From a minimum of 4200 ft. above sea level, where the worst flying conditions consist of a fog and smoke-covered terminal city valley, they fly to the higher ranges of the Continental Divide where snow storms and fog reach to heights greater than the ceiling of the mail plane. In daylight these conditions are often well-nigh heart-breaking to the pilot; at night they are many-fold worse. It is a striking fact that each offers a brand new problem, one which must be solved on its own merits without reference—except for the accumulation of general experience—to those of the day before.

The pioneer work carried out by the United States Air Mail Service has long been recognized as of paramount importance in the development of regular air transportation. In night flying operations the Air Mail Service has massed more experience than has been gained anywhere else in the World. Edmund T. Allen is an Air Mail pilot on the Mountain Division who has had considerable experience, and his remarks and ideas on night flying are, therefore, of genuine significance.

Flying at night back and forth across the chief ranges of the Rocky Mountains regularly for some years has precipitated certain outstanding problems in the minds of the pilots of the Trans-Continental Air Mail Service. Chief among these are, first, the great difference between day and night flying, second, between flying over a familiar and an unfamiliar course; and, third, and by all odds the greatest distinction to be made, that between good weather night flying and bad weather night flying.

It is only the last of these which will be discussed here, and we shall try to outline, in general, the problems involved and some of the ways in which they may be expected to be solved in the near future.

The lighted airway, of which we are all so proud, is a magnificent gesture in the direction of providing an adequate aid to the pilots flying at night between New York City and Salt Lake City. It consists of revolving lighthouse beacons placed every twenty-five miles (in the East considerably closer) in practically a straight line across the continent. It is the intention of the Department of Commerce to continue this string of lighthouses during the Summer of 1927 all the way to San Francisco. One of the pilots of the Trans-Continental route, who, the records show, has flown more miles at night than any other man in the World, is given credit for the remark, now proverbial, that the present lighted airway is not needed in good weather and is no good in bad weather because one cannot see the lights through fog and snow. This is, of course, only partially true, for there are many half-way-between nights when the absence of the beacons would surely delay the mail.

Nevertheless, the whole question of the lighted airway needs to be reconsidered from this point of view. On one clear night the writer has counted eighteen of these twenty-five-mile beacons at one time when flying at 16,000 ft. over the Rockies! Their absence on such a night could make no difference whatever to the case of flying mail or passengers across the continent. On many another night when fog and snow are thick, one may find the only possible course lies at fifty feet above the Union Pacific tracks or the Lincoln Highway, or beside a barb-wire fence which one knows by heart. Under such circumstances we may pass within a mile of one of these powerful beacons without ever seeing it.

The problems which the clear night offers are outside the scope of this paper. Those of the bad weather may be considered under five headings: first, navigation with reference to three perpendicular axes, *i.e.* keeping the airplane flying level and straight; second, navigation with reference to a course between destinations; third, landing where the field is obscured; fourth, engine operation; and fifth, the collection of ice on wings and wires. The most pressing of these are the first two, namely, blind flying, and the preparation of a lighted airway which can be used in fog and snow. To these two we shall limit ourselves in the present discussion.

There is a good deal being written about the navigation of airplanes under conditions of "zero visibility", when the ground, horizon, sun, moon or stars are not visible. In such weather, flying must be done either by instruments or by so-called "feel." While it is quite certain that such flying can be accomplished for short periods in relatively smooth air, it has never been positively demonstrated as possible for an indefinite time. The point is that very often reference points, such as glimpses of the ground or a star in the mist, or the aura of the moon through clouds, or a dim dark line of horizon in a gray sphere encompassing the machine, become visible momentarily or constantly without the consciousness of the pilot that such is the case.

Many aeronautical people wonder why complete blind-flying is so difficult. The explanation is that the acceleration of a turn, the acceleration imparted to the airplane by gusts, and the acceleration of gravity are mechanically indistinguishable from one another and cannot be separated by an instrument or by "feel." The pilot knows what the resultant of these accelerations is but he is at a loss to find the direction of the gravity component. In an airplane especially fitted up to simulate blind-flying by completely enveloping the pilot in a covered cockpit, one air organization endeavored to develop blind-fliers with all the instruments at the technician's disposal. The result was comical—only escaping the tragic by the provision of a reserve pilot in the rear cockpit of the airplane who always recovered the machine from the spin, slip, or spiral dive into which it seemed inevitably to go at the hands of the "blind" flier. It is impossible to say whether or not an indefinite amount of practice would lead to a great improvement in skill. One of the pilots who had had most practice in the blind-flying cockpit, when caught in heavy cloud at night soon after his practice, promptly went into a spin and recovered only after the plane had emerged below the storm, 400 ft. from the ground!

How shall we solve this problem? Some research carried out by one of the larger instrument makers resulted in the conclusion that an absolute horizon-indicator was an impossible thing to build even though twelve gyroscopes were used, four for each of the three axes perpendicular to each other. Is it, then, impossible to "fly fog"? We think it is not impossible; but the solution of the problem will lie in a combination of our present turn indicator and a more stable airplane which will fly itself, laterally and longitudinally. It may be necessary to have two turn indicators, one with a coarse adjustment for very bumpy air and for getting out of difficult positions, and one with a very fine sensitivity to be used in flying a given course in connection with the compass. These, together with a stable airplane, would seem to offer the most hopeful possibilities for ultimately successful blind-flying.

In the meantime pilots who are flying at night in bad weather keep within sight of the ground even though it means

maneuvering down canyons or following broken cliffs or irregular divides within a few feet of the ground. It is then only means of safety when they know their course intimately.

The second difficulty in bad weather night flying is in keeping on a course or in keeping from getting lost when one tries to take alternative courses. As was said before, powerful revolving beacons on the lighthouses at 25-mile intervals are of relatively little use when the air is thick with snow, rain or fog, or a combination of them. In such conditions, if one flies at all, it must be over terrain with which one is very familiar. Flying through mountain defiles, when the ceiling and visibility are extremely poor, is little short of suicide unless the pilot knows the terrain almost like the blind man knows his familiar haunts. Even though one knows the mountains from 5,000 ft. above "like a book," they become a foreign land when one is down between their cliffs.

There are three passes over the fog-covered Wasatch Range into the Salt Lake Valley. When the usual two are impossible to get through, the pilots of the mountain division go forty miles North of the course to Devil's Slide and Weber Canyon whose precipitous sides are barely wide enough to clear the wing tips. Very often the fog is half way down in Weber Canyon and if the mail is to get through, the airplane must travel in the lower third of this defile. The pilot who is not familiar with every promontory here does well to avoid entering Weber Canyon, for turning around once one has entered, is out of the question.

Following the Railroad

As a rule, the flying on this division as well as on the entire route is over relatively open but heavily broken country where landing outside of prepared fields spells disaster. Here the railroad is the alternative course which it is possible to follow when the beacons cannot penetrate the fog. Under these conditions the wing-tip lights on the airplane are of little use. In snow or fog filled air, the diffusion of the beam reflects back into the pilot's eyes and blinds worse than it illumines the way. The stronger the beam, the more it seems to blind one, and the usual procedure is to turn off all lights and get one's eyes adapted to darkness so that one can see even slight irregularities in a dark snow-covered landscape. Very often the roadbed of the railway is the only discernable object in the absolute gray of land and sky. Then, when flying at 120 m.p.h. with one wing fifty feet above the tracks, often a turn of the rails will put them out of sight under the fuselage. If one cannot quickly enough skid aside to reveal them again, one has the unwelcome opportunity of trying one's blind-flying ability. In one such case when the railroad unexpectedly entered a tunnel, the pilot crashed against the mountain-side before he could pick up his landmark on the other side.

It is not to be assumed that this sort of flying is the regular course of events or that the pilot who emerges from such a flight does so with any other feeling than wondering a little that he is still alive. Otherwise the air mail casualty list would be much larger than it is. There are a considerable number of cases on record of pilots touching the ground in fog without knowing they were so near to it. Such incidents practically always result in complete crashes. Usually, however, the pilot returns to the nearest field to await an improvement in visibility, or he is warned by signals of bad weather ahead and, cautiously, does not enter it. With the added responsibility of passenger carrying soon to be entered upon, this caution must be increased many-fold.

There are very often, however, flights in which the pilot will be caught in the bad weather and find it impossible to turn around without danger of losing sight of the ground or of his landmark, or he may feel that he would rather go on than go back through what he has just flown, on the assumption that what is ahead cannot possibly be as bad as what is behind. It is only in such cases of being caught in the bad weather and finding it impossible to land or get back to the last emergency field, or in cases when all the emergency fields are snow-bound and unusable, or where one believes that the very bad visibility does not extend for many miles along the course, that such flying is done at present. It is, however, surprising to find the large amount of this sort of flying that is going on, on the Trans-Continental route. If it were not done at all, the 94 per cent record of the Government air mail would be very considerably lower than it is.

How, then, shall we meet the problems of "zero visibility" in the future? Some talk of the radio beacon with its clear indication to the pilot when he is on or off his course. But the radio beacon almost of necessity implies blind-flying facilities, and here we meet with our first problem which must be solved before we can attempt blind-navigation. There are a few cases, such as flying over fog, clouds, or storms, in which the radio beacon would assist without the necessity of blind flying, but these cases often involve the third problem of landing in fog-bound terminals, a problem somewhat farther from solution than either of the others. In case of radio communication with the pilot he can be informed of the state of the terminal field and of the weather on each side of the terminal. If a clear field is found, one can perhaps fly to it, providing it remains clear until it is reached, and providing engine trouble does not develop, in which cases the blind-landing is again to be faced. There is no doubt, however, that a combination of radio beacon, radio communication, and excellent weather information will enable an improvement to be made in the number of completed bad weather trips.

We have, however, still not solved the problem. There would be many nights when flying would be possible near the ground *if the ground were illuminated*, when it would not be possible even though radio beacons work perfectly, until blind-landing has reached a state of perfection hardly imaginable today. This being the case, we must look toward a replacement of our present lighted airway with a system of lights that will be serviceable in bad weather. I would here propose the following system. It may be that it will involve a greater expenditure than the present string of lightbouses, but some day, when the amount of air travel warrants the change or the public demands it for the increased certainty of air mail or passenger service, something of the kind will enable pilots to achieve a 100 per cent efficiency in night air travel.

I would propose the substitution of a series of closely set stationary ore lights for our present revolving beacons. Every pilot knows how relatively easy it is to fly over a lighted town or a long street with are lights a block apart even when fog makes flying over the unlighted country or mountain sides impossible. If such a series of lights, set about 300 ft. apart in a line preferably along a straight road but, alternatively, straight across the great open spaces, were arranged so that the lights could be operated and controlled from central high-voltage power stations located every twenty-five miles in the same places as the present lighthouse beacons, then the present caretakers, with somewhat larger power units, could manage them at a very small expense, especially since they would need to be turned on only while the airplane was passing over that particular sector. On clear nights they could be left off altogether. The lights themselves should have wide reflectors directed upward, and should be set on short poles just high enough to enable an airplane clearing them to clear also any obstruction between them.

Such a system of lights would enable flying to be continued where now it must be defaulted. A light every 300 ft. (when the people can afford it they could be put even closer together and might serve to light a Trans-Continental highway) means to the pilot flying at 120 m.p.h. that he will cross one every 1¾ sec., a frequency that will enable him to check constantly his horizon and altitude.

The value of the enormous beacons of one billion candle-power or more, such as are being installed on some air routes for lighting long stretches of the course, is distinctly questioned by those who have to do the flying over them. When they are most needed in heavy mist and fog they penetrate only a few miles; while, if the expense and power they represent were distributed over the course in a thousand small lights set sufficiently close together, flying could be continued many miles beyond the point to which even the most powerful single beacons penetrate.

It might be a long step in advance if the Department of Commerce which is now taking over the lighted airway, were to try out such a system of lights on a small sector in one of our worst fog belts. It is only by such means that we can hope for real improvement in night flying efficiency. If the recently announced nightly passenger service to be inaugurated from Chicago to San Francisco is to attain continually increasing efficiency and safety, it must look toward the solution of these two most pressing problems of bad weather night flying, namely, blind-flying and a satisfactory lighted airway.

Note: The present acetylene blinker lights set at three mile intervals serve admirably the purpose of marking intermediate fields but as routing beacons they are of little value. When the large revolving beacons cannot be seen from station to station the blinker lights are not visible much more than one hundred yards. They do not give a clear indication either of one's height above them or of a horizon line and it is very easy to get lost between them.

(c) Fairchild Aerial Surveys Co. (of Canada)

The arrival of the Curtiss Hawks of the First Pursuit Group at Cartierville the airport of Montreal, Canada during the recent "Goodwill" Flight. It is understood that the only marker needed to bring the fliers down was the large beacon in the right hand corner of the photograph.

Neon Tubes in Use in Germany

An investigation of beacon lights, used for landing fields, in Germany, has revealed a large use of Neon tubes. The reasons given are: (1) The ease of distinguishing red from white or other lights, both near and at a distance. (2) Very small power consumption. This latter attribute is valuable on lights used for marking out the flying path, where they are left burning, without attendance, during the entire night. (3) The red light is particularly well visible in misty weather.

It is the opinion in Germany that incandescent lights used with a light filter have been unsatisfactory and consume a great deal of power.

Neon tubes are used in Germany to mark obstacles and boundary lines of landing fields, as well as to somewhat illuminate the field itself.

Light from Neon tubes is said to be visible through mist and cloud and is easily distinguishable from the great numbers of ordinary street lights where the flying field is located near large cities. Furthermore, the aviator is not blinded when approaching these Neon lights.

The tubes have been used to transmit signals by means of flashing.

As guide posts the lamps are mounted about six miles apart and are operated without attendance or switching. They are said to be visible for about six miles in good weather, about three miles in foggy weather, and shorter distances, of course, in excessive fog.

Ryan Airlines, Inc., 1926 Production

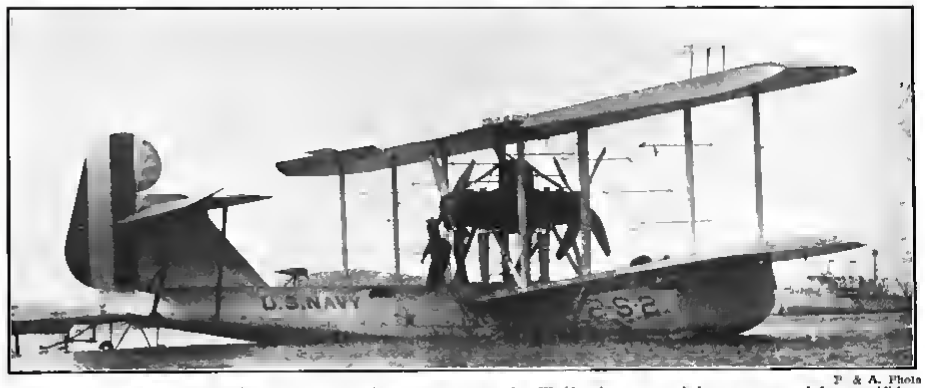
Notification has been received to the effect that during 1926, the Ryan Airlines, Inc., of San Diego, produced thirty planes. During that same period twenty-nine of the Ryan planes were in use.

Storm Halts Endurance Flight

The Boeing PB-1 seaplane, which started Feb. 12 at 9:35 a.m., from San Diego, to establish a World endurance record for seaplanes, landed at 12:41 a.m., Feb. 13, after a fifteen hour flight marked by continuous rain squalls.

During the storm the ignition on one of the engines became short-circuited due to the wet and the vibration caused by operating the other engine broke an oil heater supplying lubricant to the power plant. The plane immediately made for San Diego. When it landed, it had sufficient fuel for sixteen hours more flying.

Lieut. Frank Whilmore, the pilot, said that they would await fair weather before again attempting to break the endurance record.



P. & A. Photo

The Navy Boeing PB-1 (twin Packard 800 hp. engines) which recently attempted a World endurance record but was prevented from establishing a new high mark owing to weather conditions. A notable feature of the PB-1 will be recalled is the fact that the hull is constructed of duralumin below the waterline and of plywood above. This arrangement is said to reduce structure weight and provide a hull in which weight is brought to a minimum.

M.I.T. Students Visit Factories

In accordance with the practice of the Aeronautical Department of Massachusetts Institute of Technology, the senior and graduate students made a yearly inspection trip through the aircraft factories around New York and Philadelphia during the recess period between semesters, Jan. 31 to Feb. 4, inclusive.

The students met for their first inspection at the Loening Aeronautical Engineering Corp. The morning was devoted to a review of the manufacturing of the Loening Amphibian. The Edo Aircraft Corp., at College Point, was the next place visited where the students witnessed the production of duralumin pontoons for small commercial airplanes and the new Edo flying boat. The Sikorsky Manufacturing Corp., located in the old L.W.F. plant was also inspected. The twin-engined amphibian, which is nearing completion, gave the students an interesting conception of design.

The entire morning of the second day was devoted to a review of the Curtiss Aeroplane & Motor Co., as this was the largest plant visited a greater variety of aircraft construction was witnessed. High points of interest at this plant were the AT-4, the radial air-cooled engine pursuit and fighting machines and the manufacture of Reed duralumin propellers. A trip was also made to the Chance Vought Corp., Long Island City, as has already been reported in AVIATION. This company is producing the Vought single-seater FV-1 fighter for the Navy and is manufacturing their new Corsair, a two-place observation fighter. The latter machine afforded great interest among the students due to its marked performance with the Pratt & Whitney Wasp engine. The Brewster Co., while not usually included in the list of aircraft manufacturers, was found producing Loening Amphibian hulls and an experimental float for Vought. Interesting data was obtained here on the fabrication of duralumin. As a culmination of an interesting and busy day the men were given an opportunity of inspecting the beautiful all-duralumin motor boat "Cigarette IV", which recently won the Presidents' Cup Race, and which was built by Brewster. The Wright Aeronautical Corp., of Paterson, N. J., was the only aeronautical engine factory visited. Production on the popular Whirlwind was at full capacity, together with work on several large radial air-cooled and T-3 engines. After lunching at the Wright plant the party proceeded to the Atlantic Aircraft Co. The contract for the three-engined Fokker transports for the Army was well under way, as well as a long distance flight job. The production in this plant gave the students an excellent opportunity to study cantilever wing construction. The evening of the third day was spent at Hadley Field, the eastern terminal of the Trans-Continental Air Mail Service. Witnessing the departure of the night mail was a new sensation to many in the party. Officials of the field gave interesting accounts of the operation of the mail and the problems attached.

The party went to Bristol, Pa., and visited Huff-Daland Airplanes, Inc., where the big single-engined bombers were in production together with an experimental bomber using two 800 hp. Packard engines. Stored at this factory was K. B. Walton's D. H. Moth, the popular English lightplane. Philadelphia, with the Naval Aircraft Factory, completed the itinerary of the M.I.T. party. Development of duralumin construction has reached a high degree of perfection at the N.A.F. as was demonstrated by the examination of the TN-10, a new all metal three-purpose seaplane. Experimental spars, ribs, floats and hulls built of aluminum alloy illustrated the many uses of this material.

At each factory the members of the group were greeted by former Technology graduates who were eager to hear of the new course and the new aeronautical building. The success of the trip was made possible through the hearty cooperation of the aircraft manufacturers with Massachusetts Institute of Technology. In their willingness to show students over their factories, the manufacturers are making it possible for students at universities to gain a practical insight into the many things which they, of necessity, study only in theory. The M.I.T. students have, one and all, expressed their enthusiasm over the results of their recent trip which was made possible by the cooperation of the Aircraft Industry.

Berlin-Moscow Airline

Negotiations are being conducted between the Latvian Government and the German-Russian Air Service Company, Deruluft, and the Luft Hansa for the opening of an airline between Berlin and Moscow, via Riga, in the Spring of this year.

This new air line is to replace the one maintained since 1922 by the Deruluft company between Koenigsberg, Kovno and Moscow. This line passes over Latvian territory south of Dvinsk, but the planes do not land on Latvian territory.

At the same time it is planned to establish a direct air service line on the following route: Berlin-Helsingfors and Moscow-Scandinavia. Also in this case Riga is proposed for a landing place.

The German companies are willing to include Riga in the schedule only under the condition that an up-to-date landing place be held at the disposal of the companies mentioned in Riga, because the existing aerodrome is not fit for that purpose. The Latvian Government is reported to have assumed a favorable attitude towards the scheme so that Riga is likely to be included in the new schedule which will begin operation the end of April or the beginning of May this year.

Students of M.I.T. who made the inspection tour. Top row, left to right: Prof. W. G. Brown, T. E. Doherty, J. C. Redman, A. L. MacClain, F. T. Kurt, G. W. Brady. Bottom row, left to right: Instructor Mac Short, F. P. Malschaert, A. K. Stricker, L. H. Von Schilling, J. C. Leslie, E. J. Tousignan, S. C. Wang, F. Mc Vay

The Curtiss V-1550 and GV-1550 Engines

Water and Air-Cooled Engines Under Discussion

By ARTHUR NUTT
Chief Engineer, Motor Division, Curtiss Aeroplane & Motor Co., Inc.

BEFORE giving a description of the new Curtiss V-1550 and GV-1550 engines a discussion of the development of water-cooled and air-cooled engines will be of interest. The writer made a statement at the S.A.E. Aeronautic meeting in Philadelphia last Fall to the effect that the water-cooled engine was not dead yet by any means. The confirmation of this statement is very apparent when one realizes the number of large firms, both in this country and abroad, which are devoting their production facilities to water-cooled engines. Both the Packard Motor Car Company and the Curtiss Aeroplane & Motor Company, Inc., are manufacturing water-cooled engines exclusively. Rolls Royce, Ltd., and D. Napier & Son, Ltd., in England, are devoting their time to water-cooled engines. In France, the Hispano-Suiza, and in Italy, the Fiat Company are building water-cooled engines. There are a number of firms in these foreign countries which are also making air-cooled engines exclusively.

Air-Cooled Vs. Water-Cooled

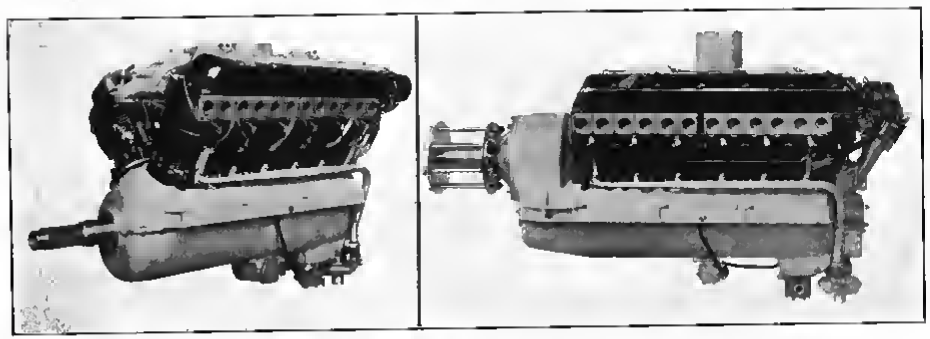
To date, there is no question as to the superiority of the performance of water-cooled aircraft engines since they will give a mean effective pressure of 135 lb. per sq. in. at 2,300 r.p.m. without supercharging, with a compression ratio of 5.5 to 1 consuming undoped fuel. This is clearly shown by the power curves of both the Curtiss D-12 and V-1550 engines. The nearest approach to these figures of which the writer is aware is in the Curtiss R-1454 air-cooled radial engine which uses the McCook Field type "M" cylinder. As shown on the power curve, this engine developed 135 M.E.P. at 2,050 r.p.m., this M.E.P. being developed at approximately 250 r.p.m. below the water-cooled engine, and, in addition, there was a supercharging of about one inch of mercury pressure, since the above figure is given for zero pressure in the intake manifold, whereas, on the unsupercharged engine there is approximately one inch of mercury depression in the intake manifold.

The reason for the lower M.E.P. at the higher speeds in the air-cooled engine is due to the reduction of valve area per cubic inch. Practically all the air-cooled engines, except the Jupiter nine-cylinder radial, use two valves in a dome shaped combustion chamber. It has been found very difficult to get sufficient valve area in a flat head four-valve engine and still leave enough room between the valves for the flow of air for proper cooling. The compromise has, therefore, been made to use two valves with better cooling or four small valves with proper cooling, making up for the difference by means of supercharging. A supercharger applied to the large valved water-cooled engine naturally will give a corresponding increase at very high engine speeds due to the initial efficiency of the engine.

Gradual Evolution

The above discussion indicates that if a change from water- to air-cooled engines is coming it will not be sudden. Rather, will it be gradual as are all sound developments. The development of water-cooled engines is going on and should go on until the air-cooled engine has demonstrated definitely that it can supersede it. With this fact in mind, the Curtiss Company has developed the GV-1550 and V-1550 engines from the Curtiss D-12 model. The D-12 develops from 445 to 455 hp. at 2,300 r.p.m. in production with a nominal displacement of 1,145 cu. in., 4½ in. bore by 6 in. stroke. The new engines are rated at 600 hp. at 2,500 r.p.m. for the direct drive and 575 hp. at 2,500 r.p.m. of the crankshaft, for the geared engine, with a nominal displacement of 1,550 cu. in., 5¼ in. bore by 6¼ in. stroke. Comparisons with the D-12 engine will be drawn throughout the description in order to give a clear idea of the development which has taken place.

The 1550 engines are designed to go in the same engine bearers as are used for the D-12 engine. This means that the bearing areas on the new engines are not greater than those on the D-12 as far as length is concerned. However, the crankshaft has been increased in diameter from three inches to three and one-half inches to take care of additional bearing area as well as to stiffen and strengthen the crankshaft for the additional power and speed. The details of construction of the crankcase, crankshaft, and connecting rods are almost identical with those on the D-12 engine. The connecting rod bearings are the same size but the rods have been increased in section in proportion to the power of the engines. Removable bearing shells are being used in these rods to facilitate service. Steel back bearing shells are being used on both the main and connecting rod bearings. The bearings in the forked rods are "Non-Gran" bronze. The bushings in the upper ends of the rods are also made of this material. The crankshaft is held in place with eight forged duralumin bearing caps which are mounted on the parting line of the crankcases, this line being on the center line of the crankshaft. The eighth bearing referred to is an out



SOURCES OF GREAT POWER. On the left, the Curtiss V-1550, twelve-cylinder engine which develops 600 hp. at 2500 r.p.m. On the right, the GV-1550, which is the geared version of the former. It develops 575 hp. at 2500 r.p.m.

board bearing in front of the thrust bearing on the direct drive engine and in front of the pinion reduction gear on the geared engine.

The cylinder block construction differs from the D-12 in the cylinder sleeve and valve seat arrangement. The D-12 has a closed end sleeve with the valves seating in the closed steel end. The 1550 models use a sleeve open at both ends and screwed into the aluminum head. The valves seat on aluminum bronze inserts. This type of construction was developed in the V-1400 engines which had a bore and stroke of 4⅞ in. by 6¼ in., respectively, while this engine has a bore and stroke of 5⅛ in. by 6¼ in. This type of valve seat construction is being used in many air-cooled engines with aluminum heads. The valve size has been increased to take care of the increased displacement, this being possible on account of the larger cylinder bore. The Curtiss valve gear using the "T" shaped cam-followers and double camshafts is retained on this model although two of the camshaft bearings on each head have been eliminated to save weight.

Ignition System

The appearance of the accessory end of the engine is considerably changed by the use of one double Splitdorf magneto instead of two single magnetos. This ignition unit has two coils, two breakers, two condensers, two independent magnetic circuits operating from one armature and feeds two ignition distributors mounted on the back end of the cylinder head covers. This system is just as much a double ignition system as the former two independent magnetos, owing to the fact that if anything happens to one armature on an engine with two magnetos, it invariably puts the other magneto out of commission. The use of this system saves approximately twenty pounds of weight on the engine, in addition to making the accessories more accessible.

Provision is made for driving both the Curtiss triplex gasoline pump and the Air Corps C-5 pump as on previous engines. The water pump is driven from the top end of the lower vertical shaft, and the oil pump is driven through spur gears. The oil pump is located on the bottom of the oil pan near the rear end of the engine. The gearcase is provided with a pad on the upper surface for mounting a vertical generator on the upper end of the vertical shaft. The standard starter pad is provided on the gearcase and a dog in the crankshaft is so designed to take a combination jaw and six spline standard clutch.

Carburetion consists of two Stromberg NA-Y6-0 carburetors feeding through the Curtiss open intake manifolds which are well-known for their volumetric efficiency.

The conventional type water cooling system is used, a centrifugal pump feeding the two cylinder blocks at the lower end of the jacket at six points from two outlets on the pump. The water leaves the topmost point of the head from six points on each head, entering a manifold from which it can be conducted either to a radiator or through a water expansion tank and then to a radiator.

Lubrication

The lubricating system is the same as on the latest production D-12 engines. One pressure pump feeds oil directly to the main bearings through an oil manifold attached to the top of the bearing caps. The oil passes into Nos. 2, 4, and 6 main bearings, each of these main bearings feeding two connecting rods through steel tubes spun into the crankshaft. An annular groove cut into the babbitt of each connecting rod bearing insures pressure feed to the link pin bearings. The piston pin bearings are fed by the oil which is thrown into the cylinders from the crankshaft. By means of a tube spun into No. 1 main bearing at the accessory end of the engine, oil is indexed through steel pressure tubes to the camshaft bearings. The backs of the cams are drilled for lubricating the "T" shaped cam-followers. Oil is also fed from this same line to the plain bearings on the upper vertical shaft. The plain bearings on the lower vertical shaft are fed by oil which collects in a large pocket around these bearings. The oil draining from the camshaft bearings lubricates the ball bearings on the camshafts, driveshafts as well as the ball bearings on the upper end of the water pump shaft. The oil is returned to the outside oil tank in the following way: there are two scavenging pumps. One takes oil from the propeller end of the engine and delivers it to the accessory end of the engine or the back end of the engine when it is installed in an airplane. The second pump picks up the oil from the back end of the engine, returning it to the outside oil tank. By the use of this system, any air which is picked up by the propeller end pump when the engine is in a climb will be discharged into the crankcase, thereby, eliminating practically all foaming of oil in the tank caused by emulsion of oil and air.

The GV-1550 engine is a geared model, being built at the present time with a gear ratio of 2 to 1, the propeller turning at half engine speed. Regular stub tooth spur gears with a three-inch face width are used. The large gear is mounted on a Curtiss flexible coupling which absorbs the shocks in the gear train insuring long life. After a fifty hour test at 525 to 535 hp., these gears showed no wear, being in practically the same condition as when the test started. The propeller shaft is mounted on plain bearings with the outer bearing in a housing which bolts to the crankcase. The main housing, as can be seen from the photograph, is cast integral with the crankcase. Thrust is taken on a large deep grooved ball bearing. The bearings on each side of the pinion are also plain, the end thrust of the crankshaft, due to its weight when in an inclined position, is taken care of by a small deep grooved ball bearing mounted in a cap which closes the hole in the crankcase at the end of the crankshaft. This bearing also locates the position of the crankshaft in the case. In the direct drive model the crankshaft is held in position by the deep grooved thrust ball bearing located between Nos. 7 and 8 main bearings, being similar in construction to the D-12 engine.

The Geared Engine Test

The geared engine passed a fifty hour official Government test at 525 hp. at 2,100 r.p.m. last year, and, as a result of subsequent testing at higher speeds, has been developed for use at 575 hp. at 2,500 r.p.m. The direct drive model has been developed for use at 600 hp. at 2,500 r.p.m.

The direct drive model was used in one of the 1925 Schneider Cup Racers when, last year, it was flown in the 1926 race. The engine developed, with high compression, a maximum of 708 hp. at 2,600 r.p.m. and weighed 725 lb. dry. The geared model weighs 840 lb. dry, which gives an additional weight of 115 lb. due to the gearing. The D-12 engine weighs 680 lb. Therefore, by the addition of thirty-five pounds in weight, it has been possible to increase the power by approximately 150 hp. with a slight reduction in frontal area. This reduction has been possible by the use of three spur gears driving the double camshafts, the third spur being placed as an idler below the two gears on the camshafts. The bevel driving gear is mounted on this third gear. This design drops the bevel gear behind the cylinder block, thereby taking off approximately 2 in. in width at the back end of the engine. The engine has a maximum width, as a result of this change, of twenty-six inches, whereas the D-12 is twenty-eight inches wide.

It might be well to point out that a normal engine speed of 2,500 r.p.m. is something like 500 r.p.m. higher than any air-cooled engine of anywhere near this power. During violent maneuvers in pursuit planes, the engine speed in a vertical drive reaches something over 3,000 r.p.m. No air-cooled engine of radial form, as far as the writer knows, has been made to withstand this severe speed. The advocates of radial engines for pursuit airplanes must face the fact that these high speeds are not as easy to obtain with the heavy crankpin loads as they are in Vee type engine with lighter loads. The gasoline engine, particularly with a supercharger, increases its power almost directly in proportion to the engine speed. Therefore, it is very advantageous to use this speed and the Vee type of engine, either water-cooled or air-cooled, undoubtedly has an advantage in this respect. Also, other types of engines which are a compromise between the radial form and the Vee form are undoubtedly superior in respect to the heavy crankpin loads than is the radial engine.

The air-cooled radial appears to be the lightest form of engine per horsepower at a given speed. However, it is not the best form as far as head resistance is concerned, owing to its large overall diameter, as has been demonstrated by the comparative performance of the Curtiss Hawk airplane with the Liberty air cooled Vee engine and the Pratt and Whitney Wasp engine of the same power. The machine was faster and the visibility better when using the Liberty air-cooled engine.

By using high engine speeds which are at present prohibitive in the pure radial type of engine, the water-cooled and air-cooled Vee engines can compete with the radial on a basis of weight per horsepower, although at the present time the specific weight is in favor of the air-cooled radial on some of the new engines starting in production, which, however, have not been service tested extensively.

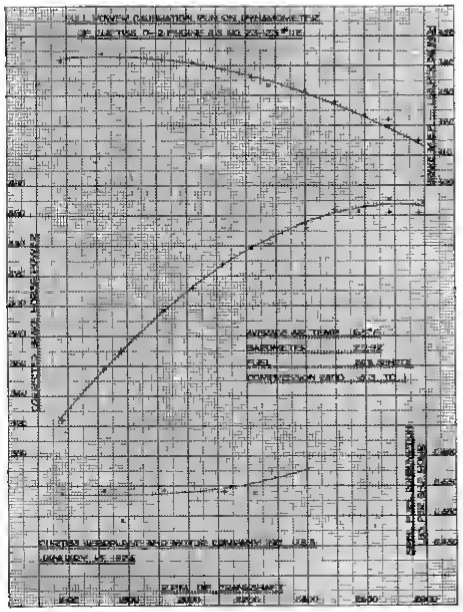
While it has not been definitely proved that the radial form of engine, with its heavy crankpin loadings, cannot be run at such high speeds as 3000 r.p.m. or more, the fact remains that it has not been done.

With more cylinders of smaller size and with the knowledge that is available at the present time, the cooling ability of an air-cooled engine is definitely limited by the amount of square inches of cooling fin that can be put on a given volume of cylinder. Therefore, if the horsepower goes up in direct proportion to the speed there will be a definite engine speed at which the air-cooled cylinder will not cool. With a water-cooled engine one needs only to supply more radiation to take care of the increased horsepower. The use of such engine speeds as 5,000 to 7,000 r.p.m. in racing car engines gives one an idea of the possibilities of further development with the water cooled type. It is very doubtful whether it will be possible to get the horsepower per cubic inch out of an air-cooled engine at these high speeds unless some radical development in cooling is made.

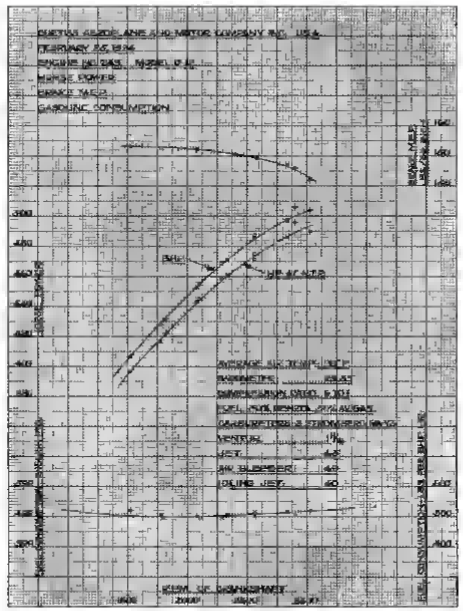
The writer has tried to emphasize the fact that the above developments of both water and air-cooled engines must be gradual, that neither one will supersede the other immediately, that there will be a field for both for sometime to come and

The Curtiss Hawk equipped with the inverted air-cooled Liberty engine.

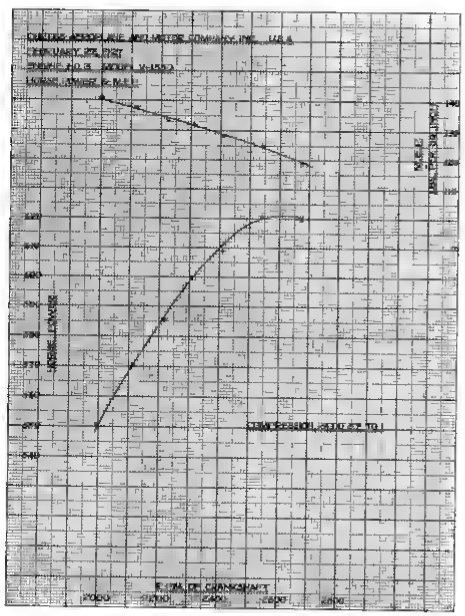
The Curtiss Hawk pursuit plane fitted with the Pratt & Whitney Wasp air-cooled engine.



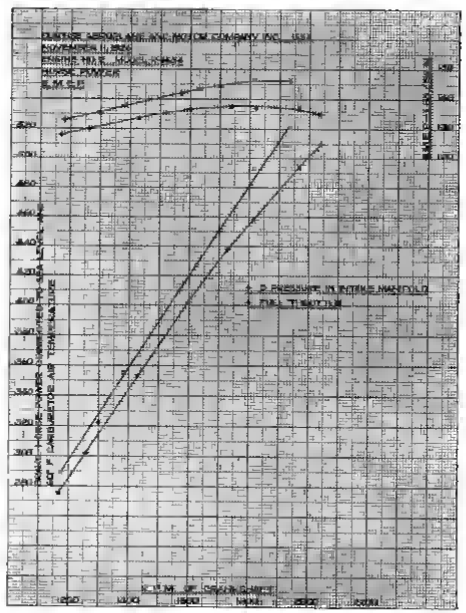
D 12 engine full power calibration. Brake hp., brake M.E.P. and full consumption.



D 12 engine calibration. Varying conditions.

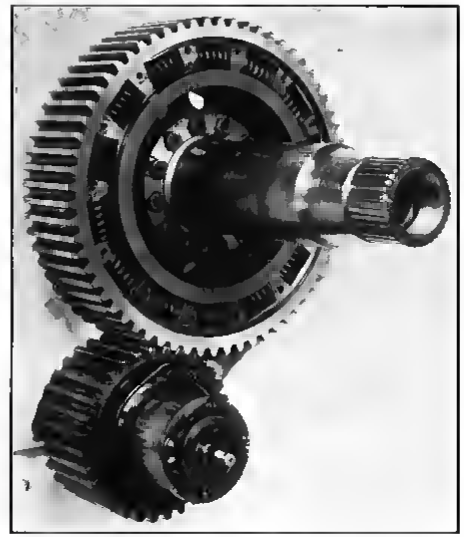


V-1550 engine calibration. Horsepower and M.E.P.



R-1454 radial air-cooled engine calibration. Brake hp. and brake M.E.P.

Note that, at the high speeds, the trend of the curve indicates that M.E.P. in the air-cooled engine drops off very much more rapidly with increase in r.p.m. than is the case in the water cooled engines.



The large gear in the Curtiss GV-1550 engine showing the flexible coupling which absorbs the shocks in the gear train

possibly for a much longer period than any of us realize. The development of the Curtiss 1550 models follows this policy.

Extensive experimental and development work is being carried on by the Curtiss organization on air-cooled engines following the 450 hp. Curtiss R-1454 air-cooled radial engine to determine the possibilities of this type of power plant, and with certain types of engines the prospects appear to be promising.

The general details of the 1550 engines are as follows:

Model V-1550

Type of engine	Water-cooled "V"—direct drive
Number of cylinders	12
Arrangement of cylinders	2 blocks of 6 cyl. in each at 6 deg.
Length of engine	51 in.
Width	26 in.
Height	35 11/16 in.
Bore	5½ in.
Stroke	6½ in.
Displacement	1550 cu. in.
Ignition	Splitdorf magneto
Carburetor	2 Stromberg NA-Y6D
Oil consumption	.015 lb. per b.hp. hr.
Fuel consumption	.55 lb. per b.hp. hr.
Rotation of propeller	Anti-clockwise
Weight of engine dry	720 lb.

Model GV-1550

Type of engine	Water-cooled "V" vertical geared
Number of cylinders	12
Arrangement of cylinders	2 blocks of 6 cyl. in each at 6 deg.
Length of engine	58 9/32 in.
Width	26 in.
Height	35 11/16 in.
Bore	5½ in.
Stroke	6½ in.
Displacement of engine	1569 cu. in.
Ratio of gear reduction to propeller	2 to 1
Ignition	Splitdorf magneto
Carburetor	2 Stromberg NA-Y6D
Oil consumption	.015 lb. per b.hp. hr.
Fuel consumption	.53 lb. per b.hp. hr.
Weight of engine dry	850 lb.
Rotation of propeller	Clockwise

Dr. Klemperer Addresses Franklin Institute

On Feb. 10, Dr. Wolgant Klemperer, research engineer of the Goodyear-Zeppelin Corp., delivered a lecture at the Franklin Institute and constituted a talk on the use and development of gliders.

Dr. Klemperer was formerly chief of the research division, of the German Zeppelin Corporation, of Germany.

Pitcairn Bids for New York-Atlanta Mail

The Pitcairn Aviation Company, of Philadelphia, Pa. was the only bidder on the proposed New York to Atlanta commercial air mail route, when bids were opened at noon Feb 23, in the office of Second Assistant Postmaster General Glover. The concern agrees to carry the mails for three dollars a pound, including equipment. It will furnish six planes at once it given the contract, and two to be held in reserve. In addition, the company agrees to have eleven additional planes available as an emergency reserve. Harold F. Pitcairn, is president of the concern.

The Department reserves the right to increase or decrease the number of intermediate stops or the number of round trips per week and to change the termini of the route by agreement with the contractors.

Flying over this route will be done entirely at night. The tentative schedule arranged provides that the plane shall depart from New York at 9 p.m. each evening, reaching Atlanta at 6 a.m. the next morning.

The tentative schedule as arranged is as follows:

Leave New York, 9 p.m., leave Philadelphia, 9:40 p.m., leave Washington 11:10 p.m., leave Richmond 12:35 a.m., leave Greensboro 2:25 a.m., and arrive at Atlanta 6 a.m. The same schedule will prevail on the Northbound trip.

The distance each way is approximately 773 miles and the postage rate will be paid ten cents per half ounce for carrying the mails over this route.

It may reasonably be expected that the Pitcairn company will be given the contract.

Pitcairn Aviation, Inc. has designed its own planes for the operation of this service. The first machine has not yet been constructed, but it is understood that it will be a normal type of biplane, powered with a Wright Whirlwind engine, and having a mail-carrying capacity from 600 to 700 lb. The company plans to hold five of these engines continuously in reserve to meet all possible emergencies.

Regarding the date of starting the service, this, of course, will depend very largely upon the activities of the Department of Commerce in lighting the New York-Atlanta airline. This work cannot possibly start before July 1, since it comes under the 1928 appropriation, which will not until then be available. However, it is known that all preparations are being made, and it may reasonably be expected that the New York-Atlanta air route will be completely lighted during the Summer and that the Pitcairn Company will be able to start operating the air mail service during the last of August or September.

Trans-Pacific Flight

Capt. John Clarke, formerly of the R.A.F., Gilbert Jenkins, of Melbourne, Australia, and L. T. Palmer, formerly of the Canadian R.A.F., arrived in Vancouver Feb. 22 to make preparations for a trans-Pacific flight next June. A Sikorsky seaplane, it is understood, will be used.

Honolulu, H. I., will be the first stop on the flight, and from Honolulu the fliers plan to fly to Sidney, N.S.W., via Fanning Island and the Fiji Islands.

N. A. T. Hangars Burn

On Feb. 23, the Kansas City hangar and offices of the National Air Transport, operators of the Chicago-Dallas air mail service, were burned down, due to a fire started by an overturned oil lamp during the night. The hangar, which, it is believed, was owned by the municipality, was completely destroyed, together with three Curtiss Carrier Pigeon mail planes, one Travel Air and five spare Liberty engines. The destruction of the hangar included the complete demolition of the N.A.T. machine shop.

It will be recalled that Kansas City is the operating headquarters of the N.A.T. and the airplane and parachute overhaul and repair headquarters. In spite, however, of the seriousness of the occurrence, the air mail has not been delayed a minute, due to the destructive results of the fire, since the accident took place. This can be regarded as a striking evidence, not only of the excellence of the N.A.T. organization, but as characteristic of the certainty and reliability of air transportation under efficient organization.

The Sperry Aero Oil Engine

Solution of Weight Reduction Diesel Problem Suggested by Use of Supercharging and Two-Stage Expansion. Paper Read Before Met. Section, A. S. M. E.

EVER SINCE the inception of the heavy oil engine, utilizing fuel injection and compression ignition, there has been a continuous effort on the part of designers and engineers to adapt this type of engine to the demands of automotive and aeronautical service in which the present gasoline engine is now predominant.

The simplicity fuel economy, efficiency and absence of fire risk made possible by the use of heavy fuel is an attractive goal for the designer of aviation power plants who is looking to the future, and it is not surprising, in spite of the highly complex problems involved, that this phase of oil engine development is being actively pursued by a number of manufacturers in this country and abroad.

While most American manufacturers have been content to reduce gradually the weight of their smaller oil engines to a point where they are practical for use in various forms of heavy mobile equipment, such as contractor's shovels and draglines, the work of the Sperry Gyroscope Company, under the supervision of Elmer A. Sperry, has for several years been directed to the study of a suitable heavy oil engine for aircraft.

The progress of this project has been summarized in a paper by Mr. Sperry which was recently read before the Metropolitan Section of the Society of Automotive Engineers, by H. J. Scharnagel, Chief Diesel Engineer for the Sperry Company.

Fuel Economy Advantages

Briefly alluding to the present heavy weight of the oil engine, the author begins his discussion by citing the fuel economy obtainable by use of the oil engine cycle. The fuel consumption of the oil engine, compared with the gasoline engine is roughly on the order of 2 to 3, so that if the engines can be placed on an equal footing as to weight per horsepower, the case in favor of the oil engine is hardly open to serious question.

In view of the fact that the present most highly developed light weight Diesels have a weight per horsepower ranging from 16 lb. to 5 lb., (although in some cases lower values have been reached), the significant weight reduction needed to reach a point comparable with aero engines is quite obvious. The difficulties encountered have been, in the structural sense, largely due to the higher maximum pressures and consequently higher stresses and bearing pressures which are encountered in Diesel practice.

The method of attack pursued in the Sperry laboratory has, however, been largely confined to the evolution of a design which would permit the use of a much higher mean effective pressure than is ordinarily used. This has been proposed by the use of a high initial supercharging pressure combined with a two-stage expansion which continues the power impulse of the expanding gases through a larger arc of the crankshaft revolution than is possible in oil engines which exhaust to the outer air.

Experimental results have lead to the confirmation of these conclusions and have been so encouraging that the production of an aviation engine is promised in the near future.

Due to the excessive amount of air which is taken into the Diesel cylinder, the combustion chamber in the Sperry cylinder has been enlarged to about four times the normal volume. Air at about forty pounds pressure from a pre-compression or supercharging pump is delivered to this chamber and, on the compression stroke, final oil is injected shortly before top dead center.

A very high maximum pressure and a mean effective pressure of 300 lb. has been achieved by this method. At the beginning of the exhaust stroke, a valve in the position of the normal four cycle exhaust valve is opened and the gases passed into a second stage cylinder and thence, at the completion of the expansion stroke in this cylinder, are exhausted into the atmosphere. The low pressure cylinder is mounted between two high pressure cylinders whose timing is arranged so that the exhaust into the low pressure cylinder takes place during alternate cycles, thus permitting it to act alternately as the expansion cylinder for two adjacent high pressure cylinders.

If pressure in the second stage cylinder were maintained at atmospheric level, the rush of the hot gases past the exhaust valve would cause serious scoring and distortion. This trouble has been prevented by maintaining a cushioning pressure in the second stage cylinder, which permits a gradual transfer of the charge, and also by cooling the outer service of the exhaust valve through fins which are exposed to the flow of air in the channel leading to the intake valve of the high pressure cylinder.

The combination of supercharging and two-stage expansion is thus announced as the principal contribution which has been made to the problem of weight reduction, the result being approached by increasing the output of the cylinder rather than by unusual reduction of masses. The difference between the normal Diesel mean effective pressure of about 80 lb. and the 300 lb. mean effective pressure of the high pressure supercharging engine is considered sufficient to overcome the handicap of the 135 lb. pressure achieved in the average aviation engine (which is the highest obtainable before pre-ignition is encountered), by a margin sufficient to make the oil engine practical for aviation service.

The difficulties encountered by other workers in the high speed field, who have not resorted to such radical means to increase the output of the oil engine, have been largely structural and otherwise intimately associated with the fuel injection system. In a high speed Diesel the time alloted for the injection of the fuel charge is so minute that the construction of a mechanical injection device capable of delivering the fuel almost instantaneously has, to a large extent, handicapped the production of high speed oil engines. No mention is made of the fuel injection system on the Sperry engine or whether the stresses encountered in high speed operation can be taken care of by an engine structure which will be within the weight limitations imposed.

A power unit, built along aeronautical lines, capable of developing 250 hp. is at present in the design stage. Four of these units will be combined in a Vee Type engine to produce 1,000 hp., the dimensions of both units being tentatively determined well within practical limits, comparable to the space required for units of equivalent horsepower now being used.

If the results are obtained in the aero type oil engine which have been indicated in the experimental conclusions announced by Mr. Sperry, the development will be of the utmost value to commercial aviation, which calls for a power plant of exceptional simplicity and unusual economy. In any event the project is worthy of the closest attention because of the highly original method of advance which has been chosen.

Navy to Enter Bennett Cup Race

As a result of the recent conference of the Federation Aeronautique Internationale, just concluded in Paris, France, it was announced that the Gordon Bennett races are to be held in the United States in 1927 between July 1 and Sept. 15.

The National Aeronautical Association will announce the exact date and the location not later than April 1. The entries must be made before May 1.

The Navy Department announced a few days ago that the United States Navy will have an entry in the elimination race, which will determine the American representatives. Lieut. Comdr. M. R. Pierce, U.S.N., has been chosen as the commanding officer of the unit from the Navy.

The Beardmore Typhoon Mark I Engine

Exemplifying the Possibilities of Obtaining High Powers With Low Revolutions Ungeared

THE BEARDMORE Typhoon Mark I engine is a six-cylinder, in-line inverted power plant, developing 800 hp., at 1,350 r.p.m., and represents a radical departure from the more standard type of aircraft engine. The advantage obtained from the inverted engine, aside from the manner in which it may be accommodated in the nose of a plane, is the greater facility with which gravity feed can be arranged, as the carburetors are automatically placed lower for the same position of crankshaft. As both the exhaust ports and the overhead valve mechanism are situated much farther away from the occupants of the plane, there will also probably be a reduction in the noise.

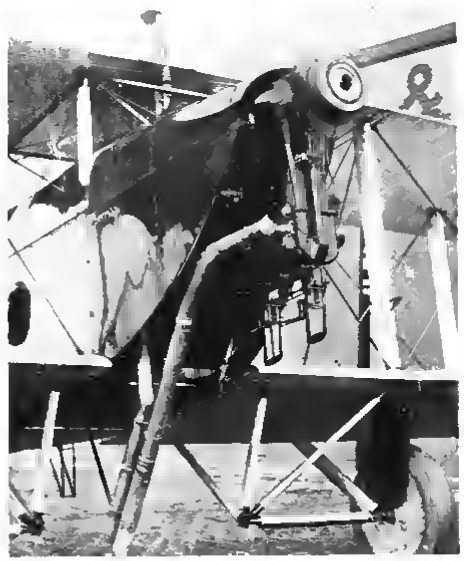
The Beardmore Typhoon is an attempt to develop the six-cylinder in-line engine beyond the point long thought possible. It will be appreciated how difficult it is to obtain 800 hp. from six cylinders, but to get that power at a speed as low as 1,350 r.p.m. is an achievement. By keeping the cylinders down to six, the number of moving parts is very small, which should help maintenance. The in-line arrangement, which results in an engine of low frontal area, gives a consequent low drag to a plane so equipped.

The ability to develop power at low speeds of revolution is of great importance, particularly in bombers or commercial planes designed for flying normally at cruising speed. Good propeller efficiency can thus be obtained without the complication of gearing.

It is claimed that the combined fuel and oil consumption is 0.46 lb. hp. hr., which means a reduction in specific weight of a plane equipped with this type of engine. As yet the British Air Ministry will not permit the weight per horse-power to be given, but the figure is said not to be excessive and, for duration flights, the weight is a matter of less importance than the fuel consumption.

Owing to the long stroke, the piston speed in the Typhoon is probably very high, but during the flight of an Avro Aldershot bomber, in which a Typhoon was fitted, on Jan. 24, at Hamble aerodrome, England, there was a marked absence of vibration. With the plane standing on the ground and the engine just ticking over, a slight vibration was noticeable, but no more than is usually the case.

The installation of the Typhoon in the Aldershot, while still in the experimental stage, shows that a very clean nose can be obtained in a plane so equipped. The engine is almost totally exposed, but as it tends to keep too cold, it is thought that some cowling and fairing will be tried. The Typhoon is in reality an inverted version of the Beardmore Cyclone, pictured and described in AVIATION on Jan. 3.



The Blackburn Typhoon engine of 800 hp. installed in the Avro Aldershot bomber.

The Avro Aldershot bomber of the British Royal Air Force equipped with the new Beardmore Typhoon Mark I 800 hp. inverted engine.

High vs. Low Bid

So many readers of AVIATION are engaged in bidding for Government business that the decision of Comptroller General J. R. McCarl on the award of a bid to the highest bidder will be read with interest. While the bid was for plumbing work, the principle is the same as in aircraft work. The letter to the Secretary of the Treasury follows:

Sept. 24, 1926

There has been received your letter of Aug. 23, 1926, requesting review of settlement C-42327 T, dated July 28, 1925, wherein credit was disallowed for the sum of $215.45 paid on voucher 57 of the July, 1925, account of J. L. Summers, disbursing clerk for the Treasury Department, representing the difference between the amount paid to Steele and Torrance Company, Bolivia, New York, for installing and connecting water service from the city water mains, and the amount for which C. H. Sage by his proposal dated Sept. 28, 1924, agreed to furnish the service.

It appears that on Sept. 12, 1924, sealed proposals were requested for installing a new water supply at the U. S. Post Office Building at Batavia, New York from the city water mains in accordance with certain drawings and specifications and in response to this request two proposals were received, one from Steele and Torrance Company and the other from C. H. Sage. The former offered to furnish the service specified in the proposal for $415 and the latter for $199.55. The contract was awarded to Steele and Torrance Company, notwithstanding it was the higher bidder, and the reasons stated for this action may be summarized as follows:

(1) That the lower bidder who at the time was engaged in buying hay, was not a licensed plumber was said by the custodian never to have been engaged in the line of work required, and that the custodian "very much doubted" his capability of performing the work.

(2) That the work required was of a highly technical character and involved considerable responsibility and that the amount of the proposal of the lower bidder showed beyond doubt that he did not understand the nature or the extent of the work.

(3) That an arrear of the unserviceable condition of the well on the premises which constituted the supply of water, and of the lateness of the season, relief should be expedited.

(4) That the competency of bidders is for determination by the administrative rather than the accounting officers.

The purpose of the statutes requiring competition is primarily to give the United States the advantage of the lowest available price for the material or service desired and presupposes the acceptance of the lowest bid conforming to the stipulated conditions; hence a higher bid may not properly be accepted and higher cost be thus paid unless the reasons for the rejection of a lower bid are of such material character as to fully warrant such action and support the higher amount to be paid. Competitive bidders as well as the public in general are concerned in the acceptance of the lowest bid and if it appears that the rejection is upon insufficient facts there arises a proper question for the consideration of this office of the administrative action in accepting the higher bid. 5 Comp. Gen. 330.

The reasons given for the award to the higher bidder are not sufficient to warrant the action taken. The requirements governing the services to be furnished were clearly specified, providing that the manner of making the connection to the street main, the kind of pipe used and the method of laying it should be in accordance with the regulations of the city and water department; the request for proposals not stipulating that bids from licensed plumbers only would be considered. It must therefore be assumed that in proposals to perform the service "in accordance with specifications and drawing" Mr. Sage was prepared to secure the specified material and to engage the service of workmen capable of performing the work so as to meet the requirements of the city regulations. The fact that he was engaged in buying hay was not of itself a disqualification for the job he proposed to execute, and if the amount of his bid was so low that the services could be furnished only at a loss to him that was a matter with which the United States was not concerned. A 12039, May 7, 1926.

With respect to the urgency of the matter, represented as another of the considerations influencing the acceptance of the higher bid, it is noted that the matter of time was not mentioned in the request for proposals nor in the acceptance of the proposal of Steele and Torrance Company and it has not been shown that Mr. Sage could not have executed the service as promptly as did the accepted bidder. It is also noted that although the request for proposals was dated Sept. 12, 1924, the award was not made until Dec. 22, 1924, and the service not completed until May 21, 1925. Furthermore, an unexplained feature of the transaction is that although the time limit for receiving proposals was 2 p. m., Sept. 27, 1924, the accepted proposal of Steele and Torrance Company is dated Oct. 22, 1924. See the decision of the English House of Lords in *Rex v. Roberts* (1925) A. C. 573 819, upholding the authority of an auditor to review and disallow payments made by administrative officers under a statute which permitted said officers to make payments as they "may think fit." It was there contended, as here, that the matter was one of administrative discretion and the court said, among other things, that if such was the law

"* * * the auditor could not examine at all into prices paid for the goods purchased. Extravagant expenditure on permitted objects would receive an absolute charter of immunity, and a statutory body, strictly tied up in one dimension, would be free to move to infinity in another. * * *" The purpose, however, of the whole audit is to insure wise and prudent administration and to recover for the council's funds money that should not have been taken out of them. * * * His mission is to inquire if there is any excess over what is reasonable. I do not find any words limiting his functions merely to the case of bad faith, or obliging him to leave the rate payers unprotected from the efforts of their pockets of honest stupidity or impractical idealism."

The settlement must be and is sustained.

Navy Will Not Compete in Schneider Race

The Navy Department announces that it will be impossible for it to participate in the Schneider Trophy race in 1927. The statement to this effect is as follows:

"The Department feels that it has fostered racing as far as it can under present conditions. Valuable information has been obtained in the development of planes and engines for the Navy. The Department believes that the amount of such information likely to be secured through a continuance of racing activity would not be commensurate with the expenditure of funds involved.

"The decision that the Navy will not enter the Schneider Cup race this year does not mean that this country need not be represented by private citizens. The Schneider Trophy race, in which this country has already won two legs out of three, should be perpetuated as an international sporting competition aside from any bearing that it may have on the development of service aircraft. If the Schneider Trophy race can be to aviation what the old America's cup was and is in yachting then the deal will have been reached."

To Light Los Angeles-Apex, Nev. Airway

Contracts have been awarded by the Commerce Department for the lighting of twenty lights, of which seven are at intermediate fields, on the Los Angeles to Apex, Nevada airway. Under the contracts just awarded, the firms will furnish the labor, power sheds, and the Government will furnish the towers, beacons and equipment.

P & A Photo.

Martin T3M-1 planes of the Navy VT Squad. 1 and VS Squad. 1 arriving at Biscayne Bay, Miami Beach, Fla., on their recent flight from Hampton Roads to Guantanamo Bay, Cuba.

An Approach Towards the Fool Proof Airplane

Professor Merrill, of California Institute of Technology, Develops Airplane Which Takesoff, Flies and Lands Itself

PROF. ALBERT MERRILL, of the California Institute of Technology, Pasadena, Cal., whose experiments in the production of a safe, fool proof airplane have covered twenty-three years, has produced what he believes to be a machine which will give the highest safety performance.

Flying hands-off in Prof. Merrill's plane the "Stagger Dreadnaught"

The new plane has a wing spread of 24 ft. It is powered with an Anzani air cooled, six-cylinder 45 hp., radial engine, and is capable of making 75 m.p.h., with the engine turning 1470 r.p.m. The idea involved in the plane's construction was to eliminate the elevator as a means of fixing and controlling the trim angle. It is the designer's belief that the elevator is a source of danger and not a safety measure because it permits the pilot to place the plane in such a position that all elevator control is lost.

In Professor Merrill's plane static stability in pitch is obtained by means of a stagger-décalage system in the supporting surfaces and no fixed stabilizer is necessary. The biplane wing structure is pivoted at the rear beam of the top surface and rotates about this point so that the angle of the wings can be altered with respect to the fuselage. This motion is controlled by a wheel and worm-gear mechanism which is not reversible. In operation, the wings are set at the proper take-off angle, the throttle is opened, and, when the necessary speed is obtained, the plane takes off.

Upon landing, the biplane wing structure is moved so that the three-point landing angle is fixed and this checks the rolling without any necessity for wheel brakes. The plane has had twenty-five hours in the air at the time of obtaining this information, and the landing runs have never been over 100 ft. With this system, the machine can never be put into any condition which prevents the pilot from changing the trim angle. Figures of eight and other manoeuvers can be made with the use of rudder only.

The brief specifications of the machine are as follows:

Chord	3 ft.
Gap/chord ratio	1.1
Wing loading	5.6
Power loading	17.5
Length overall	12½ ft.

De Pinedo Reaches Brazil

After several unsuccessful efforts to take-off with a full load from Bolama, Portuguese Guinea, Comdr. Francesco de Pinedo, abandoned his original plan to fly from the West Coast of Africa to the mainland of South America. Unusual atmospheric conditions were given as the cause of the change in plans. Instead, he flew from Port Canico, Cape Verde Islands, at 1.10 a.m., Feb. 22, landing at the Island of Fernando Noronha, a distance of 1,432 miles, in twelve hours.

After circling the island, Commander de Pinedo attempted to fly to the mainland of Brazil, but a contrary wind compelled a return to Fernando Noronha. Further complications arose when the plane was accidently damaged while moored. This was hastily repaired, and Commander de Pinedo flew to Port Natal, Brazil, Feb. 24.

A report, made to the Italian Government, said that from the arrival of the fliers at Bolama to their departure for Brazil, they were compelled to meet many emergencies.

December Aircraft Exports

The Department of Commerce, through the Bureau of Foreign and Domestic Commerce, Washington, D. C., announces the export of aircraft and engines from the United States, during December, 1926, was as follows:

Countries	Engines for aircraft Number	Engines for aircraft Dollars	Airplanes, seaplanes and other aircraft Number	Airplanes, seaplanes and other aircraft Dollars	Parts except tires Dollars
France	—	—	—	—	1,930
Spain	—	—	—	—	75
United Kingdom	—	—	—	—	7,590
Canada	—	—	—	—	1,741
Nicaragua	—	—	1	9,500	—
Salvador	—	—	—	—	260
Mexico	1	4,500	4	50,000	1,957
Bermuda	—	—	1	2,000	—
Argentina	—	—	—	—	754
Brazil	—	—	—	—	944
Chile	—	—	1	28,000	—
Peru	—	—	5	43,085	1,993
Australia	—	—	2	2,055	—
Total	1	4,500	14	139,640	17,244

MERELY A COINCIDENCE. Professor Merrill's "Stagger-Dreadnaught" landproof airplane taking off in company with a Travel Air. (See page 474)

Byrd and Davis Will Try for Orteig Prize

Two aspirants for the Raymond Orteig $25,000 prize for a non-stop flight between New York and Paris have announced their intention of competing for the award next Spring and Summer. Comdr. Richard E Byrd, who plans to use a Fokker monoplane, of the type in which he flew to the North Pole, will be accompanied by Floyd Bennett, who was also with him on the polar flight. A definite date has not been set by Comdr Byrd, but it is said he expects to leave late in May or early in June.

Lieut Comdr. Noel Davis, who filed his application with the National Aeronautic Association for entry into the race over six months ago, is another competitor for the prize, although it has been said that he will join Comdr. Byrd in the flight. Confirmation of this report has not been obtained

Commander Byrd to Explore South Pole

During a lecture at the Goodyear Theatre, Akron, Ohio, held under the auspices of the Akron Chapter of the National Aeronautic Association, Feb. 22, Comdr. Richard E Byrd announced that he plans to make explorations of the South Pole regions in an Akron-built airship.

He said that he believed such an exploration would yield data invaluable to the scientific world

Air Minister Ends 12,000 Mile Flight

On Feb 17, Sir Samuel Hoare, British Air Minister, and his wife, Lady Maud Hoare, arrived in London, after a 12,000 mile flight. This completed the flight from England to India and return, which began Dec 27, 1926, from Croydon.

Fog prevented the completion of the last stage, from Paris to London. Sir Samual said that they had encountered all varieties of storms during their flight: dust storms in the Persian Gulf, an earthquake on the Northwest frontier of India, and much snow, rain and adverse winds

The program of the flight was carried out without delays. Captains Barnard and Dodd and Navigator Johnson piloted the plane, a three-engine DH-66 Hercules airliner of Imperial Airways.

Planes for Hudson Bay Survey

The Department of Commerce announces that airplanes will be used by the commission, recently appointed by the Dominion Government, to conduct an investigation into navigation on the Hudson Bay and Hudson Strait. It is expected that three bases will be established and six planes used. The work will commence during the Summer

A close-up showing the mechanism for altering the wing incidence of Professor Merrill's foolproof airplane. The pilot is Walter Cleverie, Prof. A A Merrill is holding the card and on the right is H. L. Trautman. (See page 492).

Captain Wilkins on Second Arctic Expedition

Capt. George Hubert Wilkins, commanding the Detroit News-Wilkins Arctic Expedition, left Detroit Feb. 5, prepared for an expedition of a few weeks in the air or two to three years afoot on polar ice, should the planes meet with a mishap. He reached Fairbanks, Alaska, Feb 23. This is in reality a continuation of last year's expedition during which Captain Wilkins experienced some very bad luck.

A. M. Smith, staff correspondent of the Detroit News, accompanied by Captain Smith, and the personnel of the flight, comprising Carl B. Eielson, chief pilot, Howard Mason, radio operator, and Orvil H. Porter, mechanic, met Captain Wilkins at Seattle. A second mechanic will be engaged at Fairbanks, where the first real test of the planes will come in the flight over the Brooks Range to Point Barrow, a distance of 600 miles. In flying over the mountains, the planes will have to attain an altitude of 10,000 ft

Two Stinson Detroiters, for use in the expedition, were shipped to Seattle, for reshipment to Fairbanks. A third plane, the Alaskan, one of the Fokkars used by Captain Wilkins last year, is at Fairbanks and will be taken to Point Barrow.

The Detroiters will be used by Captain Wilkins in the flights over the Polar Basin. It is planned to make trips on the ice and take soundings of the ocean depths to determine the likelihood of the existence of land near by and its location.

Two planes will remain at Point Barrow, prepared to bring aid to Captain Wilkins, in case radio communications can be maintained. If contact is lost for more than two days, the planes at Point Barrow will be under orders to return to Fairbanks, leaving Captain Wilkins and his pilot to "foot it," in case the plane is disabled

Upon arrival at Fairbanks, Captain Wilkins began reconditioning the Alaskan to have it ready by the time the Stinson Detroiter planes arrive. He plans to fly from Point Barrow, March 15

N.A.C.A. Universal Test Engine

N. A. C. A Report No 250, entitled Description of the N A C A Universal Test Engine and some Test Results, by Marsden Ware, describes the 5-inch bore by 7-inch stroke cylinder test engine, used at the Langley Field laboratory of the National Advisory Committee for Aeronautics in laboratory research on internal-combustion engine problems and presents some results of tests made therewith

The engine is arranged for variation over wide ranges, of the compression ratio and lift and timing of both inlet and exhaust valves while the engine is in operation. Provision is also made for the connection of a number of auxiliaries. These features tend to make the engine universal in character, and especially suited for the study of certain problems involving change in compression ratio, valve timing, and lift.

Incidental to investigations of carburetor and fuel injection engine problems, considerable data have been obtained which indicates the effect of changes of compression ratio on friction horsepower and volumetric efficiency. From this, and some other work, it appears that with a change in compression ratio from 5 to 13, the friction horsepower obtained by motoring the engine increases by about fifteen per cent. The volumetric efficiency of the engine was found to remain practically unchanged between compression ratios of 5.3 and 7.3 with carburetor operation and between 9.5 and 13 with fuel-injection operation

The results of some tests are presented also that show the power obtained when operating as a carburetor engine on aviation gasoline at compression ratios in excess of that which will permit full throttle as a normal engine and controlling detonation by throttling the intake charge and by varying the inlet valve timing. For fixed compression ratios in these tests, throttling gave the least power, while variation of the inlet valve closing time, with the opening time kept fixed, gave the greatest power for the conditions tried.

A copy of the full report may be obtained upon request from the National Advisory Committee for Aeronautics, No 3341 Navy Building, Washington, D C

The King Bird three-place plane (OX-5)

The King Bird Airplane

A Three-Passenger OX-5 Commercial Plane

THE King Bird is a three-place commercial biplane, manufactured by the Western Airplane Corp., of Chicago, Ill

The fuselage of this plane is constructed of Shelby seamless steel tubing, welded at the joints, and free of wire trussing. The new W A C wing section is used. This is a high lift section with a very good L/D ratio. The rudder is controlled by a suspended pedal action, and is balanced. Dual control is provided in the rear cockpit, if required.

The King Bird is so designed that the installation of any of the usual types of commercial engines such as the OX-5, Hispano or Whirlwind, varying from 90 hp. to 220 hp., is permissible. An OX-5 is fitted as standard equipment. The engine mount is detachable by means of four bolts.

The seats are built of plywood and are of the bench type, equipped with air rubber cushions, and provide the greatest comfort for passengers and pilot.

Laminated spruce main spars are used in the wing structure and the ribs are built of spruce and Port Orford cedar. The stabilizer is adjustable from the cockpit

General specifications, performance and dimensions of the King Bird, as provided by the manufacturer, are as follows:

Length overall	25 ft 4 in.
Height overall	9 ft.
Spread overall	35 ft.
Chord	5 ft
Total area including ailerons	370
Weight empty	1200 lb
Useful load inc fuel oil and water	800 lb
Gross total	2000 lb.
Power loading	22.2 lb/hp.
Wing loading	5.2 lb/sq. ft
Landing speed	70 m.p.h.
High speed sea level	95 m.p.h.
Cruising speed	85 m.p.h
Climb in 1 min	900 ft.
Service ceiling	12 000 ft.
Endurance, full throttle	5 hr

A front view of the King Bird (OX-5)

Foreign Aeronautical News Notes

By Special Arrangement with the Automotive and Transportation Divisions, Bureau of Foreign and Domestic Commerce

Airdrome Opened at Edmonton, Canada

A municipal airdrome has been opened recently at Edmonton, Canada, to public use by the City Commissioners and has been officially licensed as an airport by the Dominion Government. In addition to being licensed as a harbor, Edmonton will also be made a customs airport. This is an important development, particularly in its relation to international traffic, as it means that airplanes from the United States will have to be examined by customs officers.

The new airport is about three miles from the principal business section of the city. The city has prepared three landing runways, one running North and South, another East and West, and a third diagonally across the field. It has spent about $500 in clearing, ploughing and grading the landing runways. It also contains a hangar, which was put up some years ago by a private aircraft company and which has come to the city with the lands. So far as any improvements are concerned, these probably will be provided by the Dominion Government in the near future, as it is not the intention of the city at present to do more than provide the field, prepare the landing runways and keep the existing hangar in condition. Two airplanes will be sent out soon from the High River station to make tests in this city of a new type of air-cooled engine. It is the purpose to get as much information as possible so as to show the effect in really cold temperatures on these engines. There are seldom any high winds in this city such as occur in the southern portion o. Alberta or in the State of Montana, Edmonton Winters being noted for their lack of any wind. It is the Canadian intention to keep these airplanes here for patrol purposes to report fires in the large forest areas North and West of Edmonton.

Propose Calcutta-Rangoon Air Service

India will soon have a regular commercial air service between Calcutta and Rangoon, if the recommendations of the Indian Air Board are carried out. Up to the present time India has done very little to develop her commercial air service and the route suggested promises the greatest chance of success. It is believed that this service could be maintained for at least eight months in the year and possibly during the monsoon season also.

The Indian Air Board are satisfied that such air service must be expected to operate at a loss in the early stages and that until public confidence has been created, a subsidy would be necessary. If the Government of India accepts this proposal, the next step will be to call for tenders for operation of the service under conditions which would provide for the Government constructing and equipping bases which would be leased to operators who would also be provided with meteorological information. The licensed company will also be required to be registered in India with rupee capital and afford training and opportunities for the employment of Indians in all branches of its work.

The Indian Air Board have also suggested that it might be practical for a night service to be inaugurated between Calcutta and Bombay, so that letters mailed after business hours in Calcutta could be delivered before business hours in Bombay the next morning.

Included in the report of the Indian Air Board was a recommendation urging its own extinction and the appointment of a director of Civil Aviation to take over its work.

Progress in Australian Aviation

Important developments in Australian aviation, particularly as regards the Australian air force, are forecast for 1927. Although the settlement of actual details has to be postponed until the return from England of the Minister for Defense, the main lines of the future program are already established.

Chief among the projects contained in the program is the proposal to increase the Australian air force by an additional squadron of machines to provide for the replacement of existing machines, for the completion of the new depot at Laverton, and for an increase in the personnel to command the new squadron. The proposed flight of British airplanes from England to Singapore is another event scheduled for the current year, and it is thought in Australia that the Minister for Defense will probably be able to announce soon that a complementary flight from Australia to Singapore, to link up with the British airmen, has been decided upon.

The question of the type of machine most suitable for Australian requirements has also received consideration. The fact that there is no established aircraft industry in Australia, that distances are greater than in Britain, and that tactical considerations in British home defence differ from those prevailing in Australia are the chief factors necessitating a somewhat different type of machine from that required by the Royal Air Force. The absence of an established industry involves the provision of ample reserves, and necessitates a type of machine, the engine of which can be easily replaced or transferred to another plane. In England, where enemy air attacks would be suddenly launched and as suddenly completed, the necessity for a quick-climbing type of machine is paramount, whereas in Australia air endurance is of chief importance.

Among aircraft designers and manufacturers interested in Australian requirements is the de Havilland firm of England, which has evolved plans for a machine DH 65 which, it is claimed, meets Australian requirements. It is also rumored that Australian capital is being raised for the purpose of establishing an all Australian aircraft company, the directors of which will be Australians thoroughly versed in the manufacture of aircraft. Hitherto, manufacturers have been deterred by the small local demand, but the proposed establishment of a new squadron of twelve machines, plus 100 per cent reserve for another twelve machines, together with the replacements urgently pending on existing machines, is considered locally to be sufficient justification for the establishment of a local industry even if only on a small basis.

Proposals for air mail and passenger service between Western Australian and the eastern states of the Commonwealth have been presented for the consideration of the Postmaster General's Department, and inquiries have been made by the postal authorities regarding assurance of support for such a venture.

Airports to be Constructed in Russia

It is planned to construct aviation fields in Mudacevo and Uzhoron, Russia, in the Spring of 1927. These fields will have one hangar each and a smaller administration building, as well as houses for employees. In the Summer it may be possible to extend the airline, now ending in Kosice, to Mudacevo and Uzhoron. A Czechoslovakian Aero AB-11 seaplane, powered with a 240 hp. Perun engine, was recently given a test at Uhirske Janovice, from where a flight was made to Prague.

Side Slips

By ROBERT R. OSBORN

The committee has unanimously awarded this week's Honesty-In-Advertising Prize to the chap who put the notice in AVIATION stating that he had for sale "Hisso motors in the original crates." We suppose that it was to save the feelings of the manufacturer that he neglected to specify what type of plane he was referring to as a "crate."

* * * *

The proposed state legislation in New York, which will make it a misdemeanor, punishable by two years imprisonment, to fly while drunk, is interesting in view of the question, which has been brought up here and in England, how to tell when a man is drunk. The police still cling to the old method of requiring one to walk a chalk line, picking up pins from the floor, or repeating difficult sentences. The British Medical Association says that a man is drunk only when he has "lost control of his faculties to such an extent as to render him unable to execute safely the occupation in which he is engaged at a material time." An American physician stated that in his opinion a man who knew he was drunk, wasn't, and a man who didn't know he was, was drunk. An American commander of a fighting vessel, back in the eighties, is reported to have defended one of his officers who behaved in a very suspicious manner, by stating that "no man would be considered as drunk aboard a ship he commanded, as long as that man could raise his hand to his mouth." This diversity of definition from responsible sources is likely to cause some trouble for the arbiters of our commercial aviation. For the purposes of this legislation, we think drunkeness on the part of the pilot might be defined as the repeated attempt to recover from numerous right and left spins, while maintaining straight level flight.

* * * *

The statement comes from Pittsburgh, Pa. that inebriates in that town are being sobered up in a very short time by the use of oxygen pumps. This makes matters even more difficult for the air policeman of the future—he may have to say to the judge, "Your Honor, when I arrested him he was absolutely blotto, but on the way down he put on his oxygen mask, so I guess we'll have to let him go."

* * * *

The cartoonists and joke-smiths in the daily papers have had a lot of fun out of the air mail, but none of them has been able to re-hash the old joke about the mail-man being shot when mistaken for a Confederate soldier.

* * * *

The present-day tendency of big business to merge and combine newspapers, banks, railroads, etc., has now become evident in "this airplane business." Two forthcoming attempts to make the New York-to-Paris flight for the Orteig prize have been combined—retaining, we suppose, the best features of both.

Author! Author!

Capt. Conard Westervelt, chief of the Naval Aircraft Factory in Philadelphia, has a flair for writing plays, as a sideline. He was the author of "Not So Fast", in which Taylor Holmes appeared at the Gaiety Theatre several years ago and now he has placed a new one with L. Lawrence Weber, who will put it in rehearsal this week.

The new Westervelt play is known as "Romancin' Aroond". It treats of the sailor's quest for romance when his ship puts into port. It is tense at times, even skirting the edge of tragedy it is said, but is enlivened by breezy dialogue and natural comedy situations. A sailor and a girl are the principal characters.

AIRPORTS AND AIRWAYS

Portland, Ore.

By F. K. Haskell

North Pole flights virtually have "made" commercial aviation in Alaska and, while there are not quite as many planes there as have been pictured humorously, the business of flying is well advanced, according to R. H. Merrill of Portland, who has recently departed for the Northern territory to pilot commercial planes.

Merrill is familiar with the Alaska air routes and flying conditions there. It is true, he said, that there are sudden and dense storms, but these generally are local and aviators are able to avoid them. Dangerous down currents in the lee of mountains must also be watched.

At the first annual meeting of the Pacific Air Transport company, held here recently, practically the same officers were elected for the ensuing year. C. K. Comstock, vice-president, reports that with the favorable weather of the past two weeks a number of notable flying records have been made, including that of Cunningham who flew from Medford to Portland in 1 hr., 50 min. He made the 250 miles at about 170 m.p.h., and was not aided by favorable winds.

Heavy loads of mail are now being carried both North and South over the coast route, the average recently being 125 lb. carried South, and 148 lb. on the northern trips. Fliers now report ideal flying conditions and officials are satisfied that no further delays will be experienced during the balance of the year. Twelve planes make up the P.A.T. Company's fleet on the line at the present time, eight of which are in daily use.

Appreciation of the work being done by the Aero Club of Oregon to foster commercial aviation in this state and especially in its efforts to sponsor landing fields in the various cities and towns of this state, was expressed by Commander Byrd at the Rankin Field when he was presented with an honorary life membership by the officers of the club.

L. L. Adcox, president of the Aero Club in his brief presentation dwelt upon the impetus Commander Byrd's lecture tour was having upon commercial aviation and the awakening of civilian interest in aeronautics, following his flight over the pole last Summer.

"I doubly appreciate the honor," the commander said in accepting the token of his honorary membership in the Oregon club, "because of the contact I have had with the wide awake members and their unselfish efforts to further commercial aviation. You are helping the state by your work and you are doing more, for you are helping the entire United States. With every aero club working as you are, aviation is bound to go ahead."

Tex Rankin's trim Waco plane was on the line when Commander Byrd arrived at the field and he and Portland's Chief of Police Jenkins were bundled into the aft cockpit and taken for a brief birdseye view of the city. Commander Byrd was much interested in the work being done by the Port of Portland, in building a municipal airport on Swan Island, which is adjacent to Rankin Field. The Portland Motorboat Club then took the commander in charge and in one of their fast water craft took him over practically the same territory on a spin around the island on the Willamette River.

Mrs. Julius Shulleck of Los Angeles has just completed a fast trip North from her home, via the Pacific Air Transport Company, arriving at Pearson Field, Vancouver, a little more than twelve hours after leaving Los Angeles. Mrs. Shulleck made the hurried trip here to be at the bedside of her husband.

Mrs. Shulleck was somewhat shaken by the long trip, which is considered a most trying one by even an experienced pilot. A. D. Starbuck was the pilot of the mail plane which brought her from San Francisco to Medford and Lieut. H. C. Miller was at the stick on the last leg of the flight into Vancouver.

Noel B. Evans, traffic manager of the Pacific Air Transport Company, reports that there has been a decided increase in the number of passengers handled over the line during the first two weeks of February. A number of business men of Portland are using the service for flights to Seattle and Vancouver, B. C.

Columbus, Ohio

The Aero Club of Columbus now has one hundred active members and is holding regular meetings on the third Thursday of each month. Although the club is not yet affiliated with the National Aeronautic Association, it is contemplating such action, either with that body, or some national association in the near future.

The headquarters of the club were formally opened with a two-day air carnival Aug. 21 and 22, 1926. In addition to providing accommodations for visiting pilots and transient airways passengers, it is available for use by members for bridge parties, dances, dinner meetings and similar functions.

It is not necessary to be a flier to obtain membership in the club. Interest in aviation and its development in the city puts you in line for membership. A membership in the Aero Club gives an opportunity to do something worthwhile for Columbus, brings members into close contact with aviation development throughout the country and makes for a better understanding of the possibilities and needs of aviation.

John E. Davis is president, Stuart E. Price, vice-president and Wm. F. Centner, secretary-treasurer.

Modesto, Calif.

By F. J. Rossi

Modesto, we believe, was the first City to provide for a municipal aviation field in its charter. This charter was prepared in 1910 and the present Mayor, the Hon. Sol P. Elias, who was then Chairman of the Charter Committee, is to be commended for his foresight on the possibilities of aviation.

The municipal field of fifty-four acres was purchased in June, 1920 at a cost of $55,000.00. The landing field proper consists of a strip 500 ft. by 2100 ft. and has a marker on the South end; the remainder of the fifty-four acres is used as fair grounds. The field is in an ideal location, only about one mile from the heart of the business district of the city.

It has been named "Bud Coffee Field" after Lieut. Bud Coffee, a Modesto boy and war hero, who died in an accident.

The field is in charge of F. J. Rossi, the city engineer. Clem Hunstook makes repairs to planes landing at the field.

Pendleton, Ore.

By F. K. Haskell

An airplane landing field, a necessity of Pendleton for some time, has now been secured. A tract of 120 acres, three miles east of the city, has been leased for a period of five years. Parts will be sub-leased, and the major portion will be leveled and oarked in accordance with Commerce Department regulations on landing fields.

Ypsilanti, Mich.

By Ralph Brockway

This city may well be envied by many larger ones throughout the country, for in a few swift moves it has obtained a field, built a plane, and a steel covered hangar and placed itself on the air mail route from Chicago to Detroit. The city will not be served by the air mail but there is no question but what it was good strategy to locate the field so that the mail planes would pass directly over it. The field lies between Ypsilanti and Ann Arbor and will be used by pilots of both cities. Also, with the rerouting of road M-65, the field will lie on one of the main highways to Detroit.

The pilot visiting Ypsilanti's field will find that he can have his plane serviced with gasoline by taxiing up to a pump. Water is also to be had at the field and if a flier wishes to make repairs to a plane at night he will find that the hangar is electrically lighted. The dimensions of the hangar are 114 by 32 ft. Space in the hangar has already been taken, so it is probable that a new and larger hangar will be erected this Summer.

Local pilots Richard Young, George Pinkerton and Roy Nass have been doing Winter flying.

Detroit, Mich.

The Williamson Aviation School of Detroit has acquired a fine field fifteen miles south of Detroit, between Milford and New Hudson, and has established a school there. Inasmuch as the company has its own clubhouse, airplanes and pilots, and the field borders a lake, it seems likely that the school will be quite popular.

The Overeasbier Aviation School has secured the agency for the new Air King for this district.

Las Vegas, Nev.

The town of Las Vegas has started an airport, which will be used as an intermediate landing field. The population of Las Vegas is 3,500 and each person contributed sixty cents to a fund to build the airport.

Tampa, Fla.

Will Rogers, self-appointed diplomat and aviation enthusiast, joined the ranks of Florida air passengers recently, during his February tour of the state. Due to long jumps made necessary in his speaking tour by his advance man, Mr. Rogers used the Curtiss-Lark flagship of the Florida Airways Corporation. The longest trip was made under the pilotage of J. N. Kelly from Tampa to the state capitol, Tallahassee, a distance of 250 miles.

From Jan. 1 to Feb. 15, the traffic department of the Florida Airways reports that 213 passengers flew in their planes, exclusive of employees. This gives a seven months total of 1152 passengers.

The Airways, operating a Ford-Stout monoplane, a Curtiss-Lark and two Travel Air OXX6 planes, from the Tampa airport, are engaging in a passenger business only during the temporary suspension of the air mail service, awaiting the installation of lights along the route.

During the first week of February the Sarasota Municipal airport, at Sarasota, Fla., was formally opened. This field is located three miles from the heart of the city, adjacent to the fairgrounds. Russell Holderman and E. Chadwick, well known Florida pilots have organized the Sarasota Aviation company and have two new Waco planes stationed there for commercial flying. A local aero club is being formed, under the guidance of the chamber of commerce and the chief developers of Sarasota, the John Ringling Properties.

Dr. Ralph Green, well-known neurologist of the South, has purchased a Travel Air OXX-6 plane and has placed the plane at the disposal of the traveling public of Jacksonville. It is being operated from Jacksonville airport, under the pilotage of C. Yonge. A flight from Jacksonville to Tampa during the week of Feb. 1-5 was the first trip into South Florida.

Freddie Lund, known as the Waco border-to-border flier, visited Tampa airport on Feb. 10, flying two passengers from Ocala, Florida to Tampa for the South Florida Fair.

Owosso, Mich.

By Ralph Brockway

It is to be noticed more and more throughout the country, that it is the smaller cities which have airports and really do things. Owosso, Mich qualifies in this respect

Recently B T Hammond, of this city, made an interesting flight to Grand Rapids, Mich for the purpose of taking Mrs Brown and Mrs Wilson, of the Sunbeam Hat Shoppe, to the opening of the Dubois and Munn wholesale millinery house at Grand Rapids These two ladies are the first merchants of Owosso to make use of the airplane for business purposes The flight was in Mr Hammond's Waco taking 1 hr, 25 min each way and with a head wind both times

Mr Hammond has a thirty acre field one and one half miles north of the city where he conducts a flying school, giving a complete course with no time limit or solo bond. The field is equipped with a sheet metal hangar 50 by 100 ft and gasoline and oil are always available on the field Mr Hammond has been operating for six years.

Flint, Mich.

The Lovejoy School of Aviation is preparing for spring activities and has a substantial start with forty students enrolled to date To take care of this large class, more pilots and planes are needed and Mr Lovejoy expects to add Frank Morris, E C Slonger and Wm Atwell, of the Morris Flying Circus, to the personnel

The city is now without an airport. The former site, loaned by the J. A. Welch Real Estate Co and prepared by the city, is now to be subdivided, and the pilots having planes there have been served notice to remove their property.

UNITED STATES AIR FORCES

Highest Ranking Flying Student

Lieut Colonel Walter Krueger, who has just been detailed to the Air Corps from the Infantry, will have the distinction of being the highest ranking student at the Army Air Corps Flying School at Kelly Field, Texas On March 1st he is to report at Kelly to undergo a course in flying instruction preliminary to being permanently transferred to the Air Corps

Under the provisions of an order issued by the War Department last October, Army officers in the various branches of the service are being given an opportunity to transfer to the Air Corps with the provision that they must earn their pilot's rating in the same manner as ordinary cadets, most of whom are youngsters just out of their teens

Lieut. Colonel Krueger is forty-six years old and received his original Army commission in 1901. During the World War, among other important duties, he served as Chief of Staff of the Tank Corps and was awarded the Distinguished Service Medal Lieut Colonel Krueger is at present stationed at Fort McPherson, Georgia, with the Twenty-Second Infantry. He has always been interested in the question of aerial defense and as an umpire during the joint Army and Navy maneuvers in the Hawaiian Islands, spent a great many hours in the air observing the progress of events.

Army and Navy Agree on Radio Frequencies

The Army and Navy have tentatively agreed on the mutual adoption of 545 and 3475 kilocycles as common calling frequencies in aircraft communication. The two services will eventually adopt apparatus which will be capable of operating on these frequencies.

The question of aircraft communication is difficult and complicated because of the weight and space limitations which vitally affect the capabilities of the radio apparatus carried by aircraft. As a result of study and conference, in which the equipment and characteristics of both planes and ground stations of the Army and Navy were carefully considered, the two services have, therefore, reached an agreement. A common aircraft beacon frequency of 290 was recently approved by the Inter-departmental Radio Advisory Committee.

A New Navy Field at Pensacola

The House Committee on Naval Affairs on Feb 10 voted unanimously to report favorably to the House a bill (House Bill No 16994) introduced by Representative Smithwick of Pensacola, Fla. This bill would authorize the Department of the Navy to accept from the city of Pensacola a site for an aviation training field near the city.

Assistant Secretary of the Navy Robinson appeared before the committee, stressing the need of the department for the site offered, and stating that "it is necessary to accept this land to carry on the work"

Admiral Moffett, Chief of the Bureau of Aeronautics, informed the committee that the lease on the property now used by the Navy for land training will expire in June of this year. Admiral Moffett said the city had agreed to have the proposed site in condition for the use of the Navy by July, if the bill is passed by Congress. He explained that this work would be done at no expense to the Government.

Marine Corps Will Survey Cuban Coast

To carry out a four months' program necessitating flight along the Atlantic coast from Philadelphia to Key West and Brownsville, Tex., in addition to surveying regions off both the northern and southern coasts of Cuba, two Loening amphibian planes flown by marine pilots left the Naval Aircraft Factory at Philadelphia recently.

This detachment, the VJ squadron three, is known as the Cuban Survey Detachment and is composed of Capt. James E. Davis, U. S. Marine Corps, and Lieut. Christian F. Schilt, U. S. Marine Corps, accompanied by Master Technical Sergt. B. F. Belcher, U. S. M. C., and Sergt. H. H. Dogan, U. S. M. C. Ten marines will be attached to the party at Key West for the work with the survey planes.

This flight has two objects. While its primary purpose is to assist in the surveying of two areas off the coasts of Cuba, during the flight to Cuba and after the completion of the work there, they will be engaged in obtaining data for the *Naval Air Pilot*, a publication of the Hydrographic Office, which contains navigational information for the use of pilots.

From Philadelphia to Key West the planes followed the shore line and photograph the light houses along the coast from the air. These photographs will be developed at Key West and forwarded to the Navy Department.

From Key West, the planes will fly to the north coast of Cuba and report to the commanding officer of the U. S. S. "Nokomis", which is engaged in surveying the region near Cardenas for the U. S. Navy. An area of approximately 1,500 sq. mi. will be photographed from the air preliminary to the actual survey of the hydrographic experts.

After the development of these photographs, the party will report to the commanding officer of the U. S. S. Hannibal, and will make aerial photographs of an area of 1,000 sq. mi. near the Isle of Pines.

Returning to Key West, the planes will again follow the coast line in their flight to Brownsville, Tex. They will make an aerial reconnaissance survey of the Gulf Coast of the United States, investigating facilities for seaplane anchorages, and will photograph prominent landmarks and lighthouses along the route for the Navy Air Pilot. Upon the completion of this work the planes will fly to Philadelphia.

Army Air Orders

First Lieut. Charles H. Dowman, Air Corps, assigned to duty Kelly Field, upon completion of tour of foreign service.

First Lieut. Edward A. Hillary, Air Corps, relieved from observation and treatment Walter Reed Gen. Hosp., and will return to Langley Field.

Capt. Roy E. Craig, Cav., detailed in the Air Corps. Capt. Craig is relieved from duty at Presidio of Monterey, Cal., and will proceed to Brooks Field.

Maj. Walter H. Frank, Air Corps, Langley Field, to Walter Reed Gen. Hosp., for further observ. and treatment.

Capt. John A. Wheeler, Ord. Dep., detailed in the Air Corps. Capt. Wheeler is relieved from assignment and duty at Raritan Arsenal, N. J., and will proceed to Brooks Field.

Sec. Lieut. Mason Harley Lucas, Air Corps, transferred to Field Art. Lieut. Lucas is assigned to the Field Art. of

the Sec Div., and will report to the com gen, Fort Sam Houston.

Sec Lieut. Benjamin Peter Heiser, Air Corps, transferred to the Field Art. Lieut Heiser is relieved from further attachment to the Air Corps, Sec Div., and is assigned to the Field Art of that div He will report in person to com gen., Fort Sam Houston.

Sec. Lieut. Harold E. Walker, Cav., detailed in the Air Corps Lieut Walker is relieved from assignment to the 1st Mach. Gun Squad, and from station and duty at Fort Clark, and will proceed to Brooks Field, and report to commandant Air Corps Prim. Fly Sch.

Lieut Col Walter Krueger, Inf, detailed in Air Corps He is relieved from assignment to 22nd Inf, and from station and duty at Fort McPherson, and will proceed to Brooks Field and report to commandant Air Corps Prim Fly Sch.

First Lieut Francis H Kuhn, Quartermaster Corps, detailed in the Air Corps He is relieved from assignment and duty at Kelly Field and will report to the commandant Air Corps Prim Fly Sch, Brooks Field.

Col Charles de F Chandler, Air Corps Res, Washington, to active duty, Washington, reporting to Chief of Air Corps for training He will revert to inactive status Feb. 27.

Lieut Winfield S Cunningham to continue duty with VO Squad 2 Aircf Squad, Battle Fleet Orders Jan 28 revoked.

Lieut William S Grooch to continue duty with VO Squad 2. Aircf Squad, Battle Fleet Orders Jan 28 revoked.

Lieut George A Seitz to continue duty VO Squad 2 (USS Nevada) Aircf Squad Battle Fleet Orders Jan 28 revoked.

Lieut Frank R Whitmore det VO Squad 1 (USS Colorado) Aircf Squad, Battle Fleet, to VO Squad 1.

Lieut (jg) Wilson P Cogswell det VO Squad 1 (USS Arizona) Aircf Squad Battle Fleet, to VO Squad 1 Aircf Squad Battle Fleet.

Lieut (jg) Alvin I Malstrom det VO Squad 1 (USS Tennessee) Aircf Squad, Battle Fleet, to VO Squad 1 Aircf Squad Battle Fleet.

Ens Norman W Ellis to VO Squad 2 Aircf Squad Battle Fleet (USS Oklahoma) Orders Jan 28 modified.

Lieut (jg) Clement F Cellon det Navy Yard New York to Nav Air Stat, Lakehurst.

Navy Air Orders

Comdr Worrall R Carter det off Nav Intell, to temp duty Nav Air Sta, Nav Oper Base, Hampton Roads.

Lieut (jg) George A Dussault det VO Squad One (USS West Virginia), Aircf Squad, Battle Fleet, to Nav Air Sta, Hampton Roads.

Lieut (jg) Edwin R Peck det VO Squad 2 (USS Nevada), Aircf Squad, Battle Fleet to Nav Air Sta, Hampton Roads.

Lieut (jg) Matthias M Marple, jr det VO Squad 2 (USS California) Aircf Squad, Battle Fleet, to Nav Air Sta, Nav Oper Base Hampton Roads.

Rear Admiral Richard H Leigh to duty as Chief of Bureau of Navigation.

PUBLISHER'S NEWS LETTER

The implied decision expressed in President Coolidge's recent message to the Great Powers on disarmament should not be overlooked. It will be remembered that while he requested consideration of naval disarmament, he specifically excluded from the discussion military and aerial preparedness. The grounds on which he eliminated them were the interesting points to aircraft people. He admitted that the problem of aerial defense for the United States, with broad oceans separating it from large and powerful nations, was very different from those from countries where an enemy could bomb cities within a few hours without much or any oversea flying. By inference, the President told the other powers that we will continue to follow an independent course in building up our aerial forces and do not wish to initiate any move directed towards the curtailment of our five year program.

* * * *

The elimination of aircraft from such conferences does more than appears on the surface. Invariably, at such meetings, the expert's opinion is disregarded or subordinated to political expediency or international swapping. In other words, the best plans of those whose opinion is based on ability and experience are cast aside by the diplomats and the problem of national defense is subordinated to what may be termed the strategic world position of the country. This situation need not necessarily be one where the diplomats are blameworthy; they look at a country's position in the world from a different viewpoint. So long as the aerial defense of the United States can proceed according to the wishes of our flying services, the more fortunate it will be. A reconsideration of the Five Year Program at this time over the green cloth of an international conference table would be most unfortunate and it is a cause for great satisfaction that it is not to happen.

* * * *

Recently, also, the President has made another decision which has our hearty endorsement, although in many places another view is taken. It has been decided not to compete for the Schneider Trophy this year at government expense. For many years we have taken the position that the foreign aircraft manufacturer had no chance to compete in this country on fair terms in races where it was a single manufacturer against what may be considered government money. It is not too much to say that the entire cost of the development and operation of the U. S. racing planes for the last five years has been several million dollars which is far beyond the financial possibilities of any private constructor. It will be said, with truth, that the results have been worth it, but this is difficult to prove. The results from this policy have been disastrous to entry of foreign aircraft in American race meets, except in the case of the Schneider Trophy. M. Breguet brought a plane to the Pulitzer Races in 1925 and made a serious inroad into our prestige. He was competing with McCook Field experimental appropriations as well as our best Air Corps' airplanes. One year, we had to abandon the Schneider Trophy race because of lack of foreign entries. Only three foreign aircraft companies have attempted to challenge our government backed air racers, two British, the Supermarine and Gloucestershire and one Italian, Macchi. In the latter case, it is uncertain how much incentive and support came from the Italian Government. If, as a result of the President's decision American sportsmen and the generous supporters of all aeronautical enterprises that have been launched in this country get behind a plan to go abroad with racing planes and compete for the great international aerial prizes, cups and trophies it is our belief that they will be better operated, better managed and better flown than by the old plan.

* * * *

The Bureau of Aeronautics and the Air Corps may take this criticism as directed at their handling of the races during the past few years but it is not so intended. It is almost axiomatic that anything run under government appropriations costs more than when conducted by private management. Furthermore, for reasons entirely aside from skill, personnel has to be selected from those available. In most instances the best men have been chosen as pilots but it is certain that the best pilots available in the United States, military, naval, air mail or civilian have not represented us in races because the defense of a trophy has usually been the responsibility of a single branch of the government. As these fundamental difficulties are always to be expected under government participation, we have felt that it would be better to have all international races contested for by manufacturers of the different countries with pilots selected from the entire available field. It is a natural hope that efforts will be made to have the United States fittingly represented abroad at the great races and that we may recover some of the lost trophies and records through private initiative.—L. D. G.

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FOR SALE: Curtiss D12, 450 hp. motor Weighs 650 lb., heavily geared throughout. First class condition goaranteed Pep up your new H-boat $1250 Box 3606, Miami, Florida

FOR SALE. Jenny in excellent condition Thorough overhaul last winter including repairing and varnishing of all woodwork, cleaning and repainting of all fittings, cleaning and testing to a safety factor of six of all wires, and complete new factory recover job Price $650 00 at Philadelphia. Box 538 AVIATION

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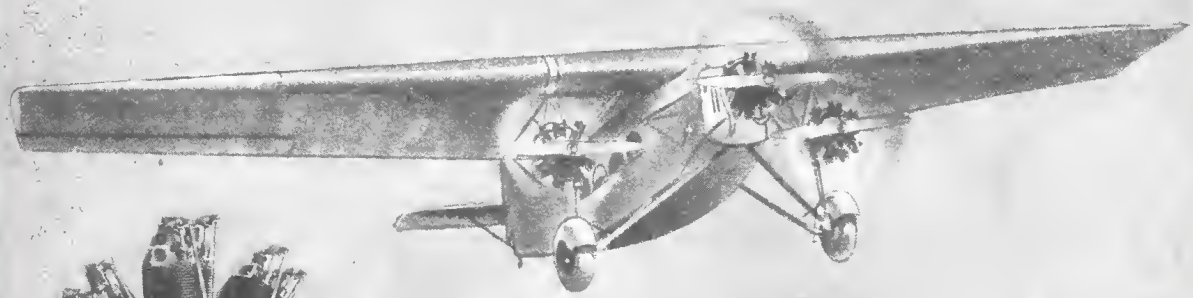

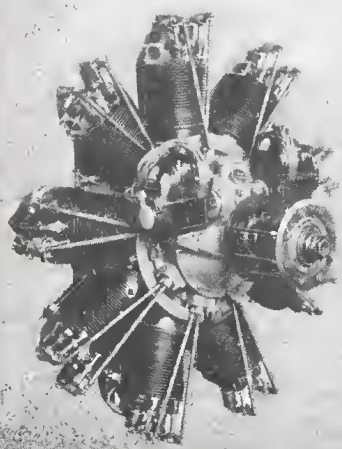

Ford 10-passenger Airliner, all metal throughout, powered with three Wright Whirlwind Engines. Sound aerodynamically, and able to fly with full load on any two of the three Wright Whirlwind Engines. This plane represents the maximum for safety, economy and comfort for commercial lines.

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